

White-centered Retinal Hemorrhage in Ocular Ischemic Syndrome Resolved After Carotid Artery Stenting

Tsung-Yu Ho¹, Po-Kang Lin^{1,2*}, Cheng-Hsiung Huang³

¹Division of Retina, Department of Ophthalmology, and ³Department of Surgery, Taipei Veterans General Hospital, and ²Department of Ophthalmology, National Yang-Ming University School of Medicine, Taipei, Taiwan, R.O.C.

Ocular ischemic syndrome (OIS) is characterized by ocular symptoms and signs that are secondary to severe carotid artery obstruction. We report a 69-year-old man who suffered from progressively blurred vision in both eyes. Fundus examination showed scattered areas of retinal hemorrhage, some with a white center, in both eyes. Fluorescence angiography revealed multiple microaneurysm-like hyperfluorescent spots over the retina mimicking diabetic retinopathy. Carotid Doppler ultrasonography revealed 90–95% stenosis of bilateral internal carotid arteries, and OIS was diagnosed. Thus, bilateral internal carotid artery stenting was performed. After treatment, the patient's visual acuity recovered within 1 month and the areas of white-centered retinal hemorrhage completely resolved within 6 months. [*J Chin Med Assoc* 2008;71(5):270–272]

Key Words: carotid artery, diabetic retinopathy, ocular ischemic syndrome, stent, white-centered hemorrhage

Introduction

Ocular ischemic syndrome (OIS) is characterized by ocular symptoms and signs that are secondary to severe carotid artery stenosis or obstruction. Stenosis of the carotid artery reduces perfusion pressure to the eye, resulting in the ischemic phenomena of OIS. OIS is best managed by aiming at the causative factors. Both eyes are involved in about 20% of cases. We present a bilaterally involved case with white-centered retinal hemorrhage, who recovered dramatically after carotid artery stenting.

Case Report

A 69-year-old man, with a history of hypertension, asthma and hypertriglyceridemia, had suspected glaucoma that was followed-up regularly for 2 years. He suffered from progressively blurred vision with best-corrected visual acuity decreasing from 6/6 to 6/15

bilaterally in March 2004. Slit-lamp examination revealed normal anterior segment. Fundus examination showed scattered areas of retinal hemorrhage, some with a white center, over midperipheral retina in both eyes (Figures 1A and 1B). Multiple hyperfluorescent spots mimicking microaneurysms were shown on fluorescence angiography (Figures 1C and 1D). The finding was confused with background diabetic retinopathy. Interestingly, hyperglycemia was noted and diabetes mellitus was suspected at the same time. Moreover, 90–95% stenosis of bilateral internal carotid arteries was demonstrated on carotid Doppler ultrasonography. Eye Doppler ultrasonography showed that peak systolic velocity of the central retinal artery had decreased to 7.4 cm/sec on the right and 3.7 cm/sec on the left. OIS with bilateral involvement was diagnosed.

Internal carotid artery stenting was performed first on 1 side and then the other over a period of 2 weeks. One month after stenting, the visual acuity of both eyes had dramatically recovered to 6/6. The white-centered retinal hemorrhage decreased significantly



*Correspondence to: Dr Po-Kang Lin, Department of Ophthalmology, Taipei Veterans General Hospital, 201, Section 2, Shih-Pai Road, Taipei 112, Taiwan, R.O.C.

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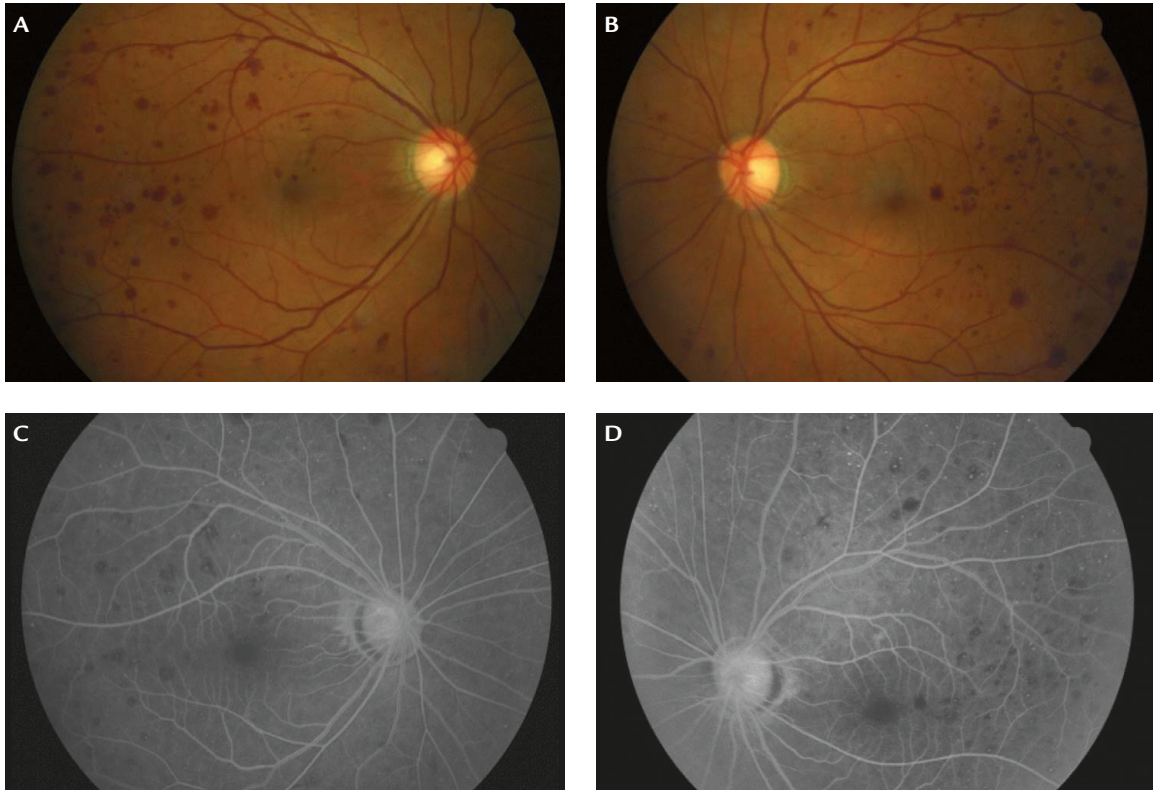


Figure 1. Fundus pictures pre-stenting. (A, B) Scattered areas of retinal hemorrhage, some with a white center, in both eyes. (C, D) Fluorescence angiography shows multiple microaneurysm-like hyperfluorescent spots over the retina.

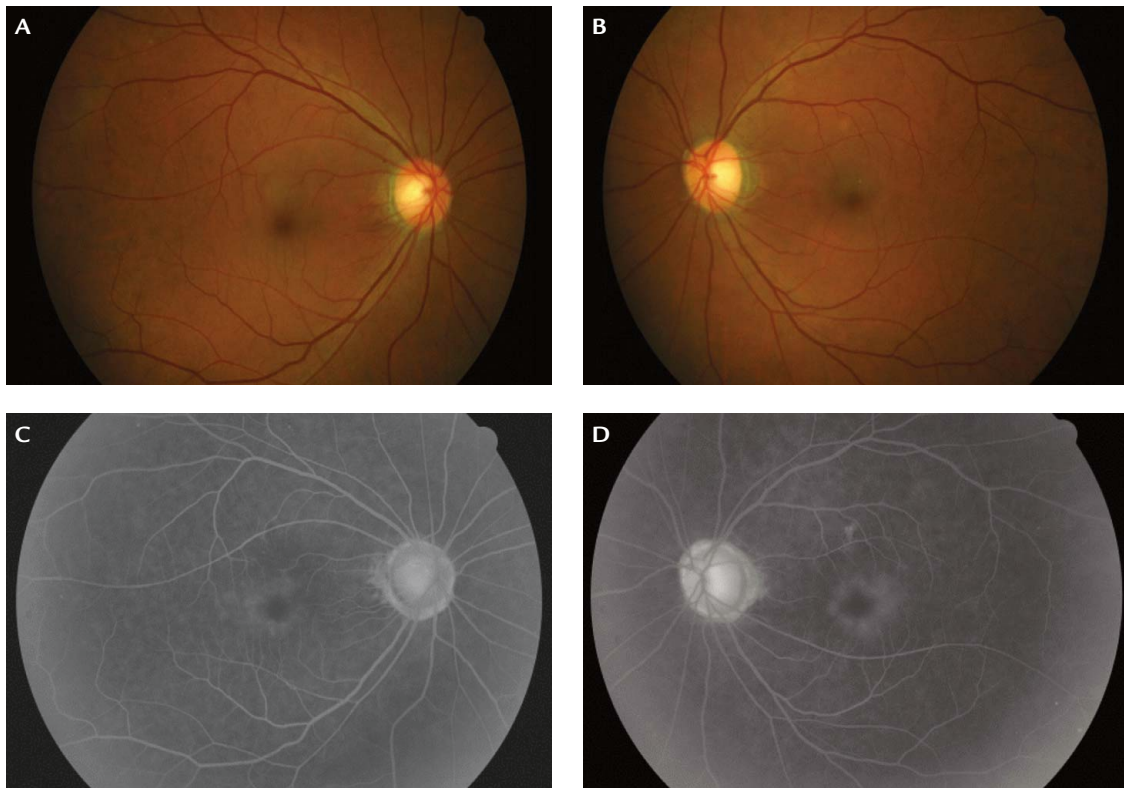


Figure 2. Fundus pictures 6 months post-stenting. (A, B) The white-centered areas of retinal hemorrhage have completely resolved. (C, D) Fluorescence angiography shows resolution of the microaneurysm-like hyperfluorescent spots.

over 2 months, and fewer microaneurysm-like spots were shown on fluorescence angiography. Six months later, the retinal lesions had completely resolved, and there has been no recurrence (Figure 2). Both carotid and eye Doppler ultrasonography data remained normal after stenting.

Discussion

In OIS, visual prognosis is usually poor, even after treatment.¹ Common retinal findings of OIS may include macular edema, dilated but non-tortuous retinal veins, midperipheral dot and blot hemorrhage, cotton wool spots, exudates, and neovascularization of the disc and retina. Sivalingam et al² proposed that the presence of rubeosis iridis is an indicator of poor visual prognosis. In this case, rubeosis iridis was not present. The visual acuity of the patient recovered quickly and the scattered areas of retinal hemorrhage resolved dramatically after bilateral carotid artery stenting. The relatively good visual outcome in this case may be due to the treatment being performed soon after OIS was diagnosed.

Interestingly, diabetes mellitus was noted in this patient when OIS was diagnosed. Mizener et al¹ reported that the incidence of diabetes was much higher in patients with OIS. In 1999, Ino-ue et al³ reviewed some diabetic patients with OIS. The retinal features of OIS mimic those of diabetic retinopathy and can easily cause confusion. Thus, it is essential to differentiate the retinal findings of OIS from those of diabetic retinopathy. The pathogenesis of diabetic retinopathy is that hyperglycemia results in vascular endothelial damage. This condition compromises the capillary lumen and causes the ischemic state of the retina. Reducing perfusion pressure to the eye in OIS patients also results in ischemic retina. The synergistic effects of OIS and diabetes mellitus lead to an even more ischemic retina. However, in this case, the microaneurysm-like lesion resolved soon after carotid artery stenting. OIS was likely to have been the main cause of the retinal hemorrhage.

The areas of white-centered retinal hemorrhage, also called Roth's spots, are commonly found in patients with bacterial endocarditis, leukemia, pernicious anemia and diabetes mellitus.^{4,5} The white centers may be due to aggregation of white blood cells, platelets and fibrin. There are few reports in the literature that describe this type of white-centered retinal hemorrhage with OIS. How they are associated with OIS warrants further investigation.

This patient was suspected to have glaucoma before OIS was diagnosed. OIS is often overlooked and misdiagnosed and treated as primary open angle glaucoma or neovascular glaucoma. Pecold-Stepniewska et al⁶ reported a case of OIS being treated as primary open angle glaucoma for 23 years. In the case of iris neovascularization or midperipheral hemorrhage, carotid Doppler ultrasonography should be performed.^{7,8}

In conclusion, the visual prognosis of OIS can be good if it is treated early. Ophthalmologists should be aware of the signs and symptoms of OIS to facilitate prompt diagnosis and appropriate referral.

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