

Retinal Detachment with Macular Hole Following Combined Photodynamic Therapy and Intravitreal Bevacizumab Injection

Eun Jee Chung, MD, Hyoung Jun Koh, MD

The Institute of Vision Research, Department of Ophthalmology, Yonsei University College of Medicine, Seoul, Korea

Purpose: To report a case of retinal detachment with a macular hole following photodynamic therapy (PDT) using verteporfin and intravitreal bevacizumab injection in the treatment of myopic choroidal neovascularization (CNV).

Methods: A 58-year-old woman was diagnosed with myopic CNV and treated with a combination of PDT with verteporfin and intravitreal bevacizumab injection that same day. She received the second injection of intravitreal bevacizumab four weeks after the initial treatment.

Results: The patient developed a sudden decline in vision one week after the second injection; and was subsequently diagnosed with retinal detachment associated with a macular hole. She underwent standard three-port pars plana vitrectomy with internal limiting membrane peeling, fluid-air exchange and silicone oil injection. The retina was still firmly attached at the patient's final follow-up visit.

Conclusions: PDT and intravitreal bevacizumab injection used for the treatment of myopic CNV can be associated with retinal detachment with a macular hole. Patients need to be informed about this potential complication, and a higher index of suspicion may be warranted in patients who report sudden vision loss after the treatment.

Korean Journal of Ophthalmology 21(3):185-187, 2007

Key Words: Intravitreal bevacizumab injection, Macular hole detachment, Photodynamic therapy

Recently, intravitreal bevacizumab (Avastin) injection has gained popularity as a potential treatment for choroidal neovascularization (CNV) associated with age related macular degeneration and pathologic myopia. The injection is utilized, either as a sole treatment or combined with photodynamic therapy (PDT) using verteporfin.^{1,2} Although there is no definitive information on longterm safety for either intravitreal bevacizumab or combined treatment, these therapies are considered safe and have no known serious ocular or systemic adverse events.¹⁻³

Herein, we present a patient with myopic CNV, who developed retinal detachment with a macular hole following combined PDT and intravitreal bevacizumab injection.

Case Report

A 58-year-old woman was diagnosed with CNV secondary to pathologic myopia in her right eye (right eye = -17 D, left eye = -15 D) (Fig. 1). The best corrected visual acuity in the

affected eye as measured with a Snellen chart was 20/200. After an informed discussion of available therapies, the patient received combined PDT and 1.25 mg intravitreal bevacizumab injection. Four weeks after the initial treatment, the patient received a second intravitreal bevacizumab injection. Both treatments were uneventful.

A week after receiving the second injection, the patient presented with worsening vision in her right eye. Her visual acuity was counting fingers at 1 m. Examination revealed retinal detachment involving the posterior pole with a macular hole. Ocular coherence tomography (OCT) confirmed the presence of a macular hole (Fig. 2).

The patient underwent standard three-port pars plana vitrectomy with internal limiting membrane peeling, fluid-air exchange and silicone oil injection. During the operation, peripheral fundus examination was performed with scleral indentation, and no additional peripheral hole was observed. On follow-up one week later, the macula had flattened and visual acuity was 20/400.

Discussion

The development of retinal detachment with a macular hole may occur as a spontaneous process in highly myopic eyes.⁴ However, the retinal detachment with a macular hole

Received: April 17, 2007 *Accepted:* July 25, 2007

Reprint requests to Hyoung Jun Koh, MD, Department of Ophthalmology, Yonsei University College of Medicine, 134 Sodaemun-gu Shinchondong, Seoul 120-752, Korea. Tel: 82-2-2228-3570, Fax: 82-2-312-0541, E-mail: hjkoh@yuns.ac.kr

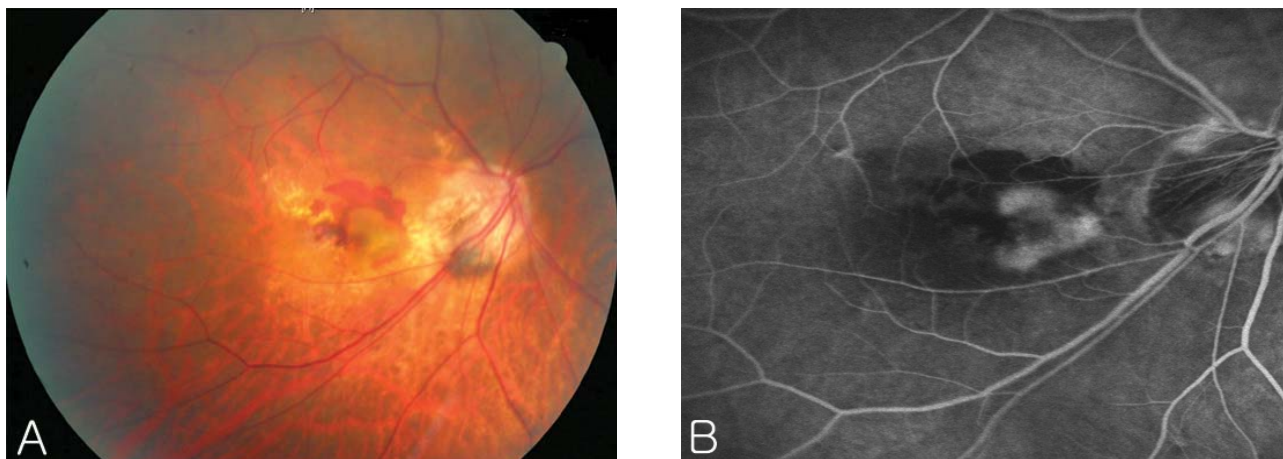


Fig. 1. (A) Fundus photograph of the right eye before treatment demonstrates a juxtafoveal grayish subretinal membrane with subretinal fluid and hemorrhage. (B) Late phase of the fluorescein angiography shows diffuse leakage from a juxtafoveal choroidal neovascularization.

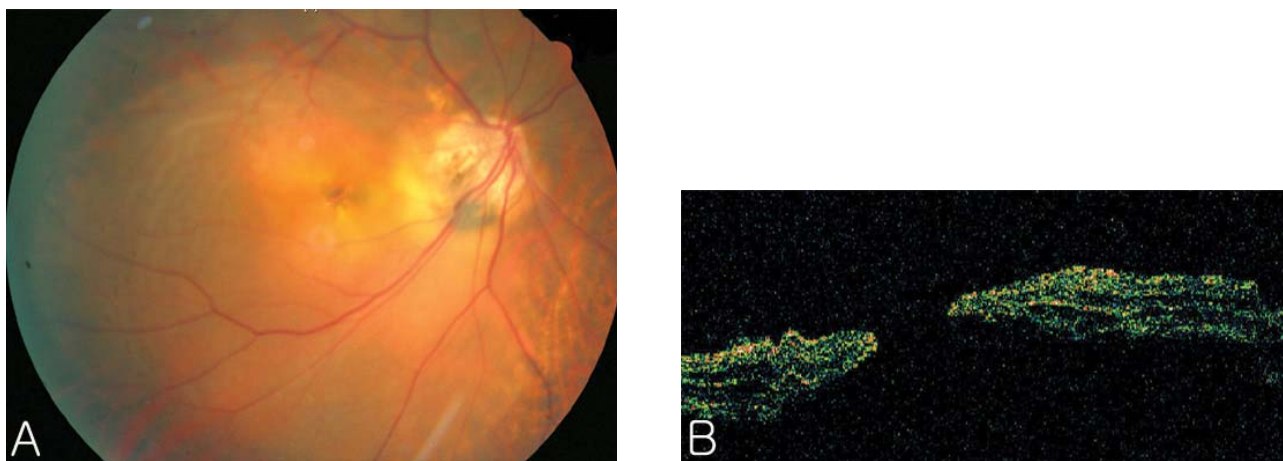


Fig. 2. (A) Fundus photograph 5 weeks after initial combined treatment of PDT and intravitreal bevacizumab, and 1 week after the second intravitreal bevacizumab injection; demonstrating serous retinal detachment of the posterior pole with a macular hole. (B) OCT confirms the presence of a macular hole.

in our patient occurred shortly after PDT and repeated injections of intravitreal bevacizumab. Therefore, the time course suggests the treatment had a potentially causal role.

Several possible mechanisms may have induced the development of retinal detachment with a macular hole. The intravitreal injection may have induced vitreous incarceration at the needle insertion site, causing vitreoretinal traction leading to development of a macular hole and subsequent retinal detachment.⁵⁻⁷ We performed a combined treatment, and there has been a report of macular hole development several weeks after PDT treatment using verteporfin. Thus, PDT may have induced the development of the macular hole.⁸ Lastly, bevacizumab itself may have caused the macular hole by modulating the permeability and activity of the CNV and inducing contraction of the vascular membrane, leading to exacerbation of tangential traction on the overlying retina.⁹⁻¹¹ The short duration in the onset of retinal detachment with a macular hole after the second injection of

intravitreal bevacizumab also suggests a possible causal role of the drug.

In conclusion, PDT and intravitreal bevacizumab injection in the treatment of myopic CNV can be associated with retinal detachment with a macular hole. Patients need to be informed about this potential complication, and a higher index of suspicion may be warranted in patients who report sudden vision loss after the treatment.

References

1. Laud K, Spaide RF, Freud KB, et al. Treatment of choroidal neovascularization in pathologic myopia with intravitreal bevacizumab. *Retina* 2006;26:960-3.
2. Dhalla MS, Shah GK, Blinder KJ, et al. Combined photodynamic therapy with verteporfin and intravitreal bevacizumab for choroidal neovascularization in age-related macula degeneration. *Retina* 2006;26:988-93.

3. Fung AE, Rosenfeld PJ, Reichel E. The International Intravitreal Bevacizumab Safety Survey: using the internet to assess drug safety worldwide. *Br J Ophthalmol* 2006; 90:1344-9.
4. Kobayashi H, Kobayashi K, Okinami S. Macular hole and myopic refraction. *Br J Ophthalmol* 2002;86:1269-73.
5. Meyer CH, Mennel S, Schmidt JC, Kroll P. Acute retinal pigment epithelial tear following intravitreal bevacizumab (Avastin) injection for occult choroidal neovascularization secondary to age related macular degeneration. *Br J Ophthalmol* 2006;90:1207-8.
6. Bakri SJ, Kitzmann AS. Retinal Pigment Epithelial Tear after Intravitreal Ranibizumab. *Am J Ophthalmol* 2007; 143:505-7.
7. Konstantopoulos A, Williams CPR, Newsom RS, Luff AJ. Ocular morbidity associated with intravitreal triamcinolone acetate. *Eye* 2007;21:317-20.
8. Mansour AM, Hussein ZM, Schakal AR. Macular hole following photodynamic therapy. *Ophthalmic Surg Lasers*. 2002;33:511-3.
9. Jo N, Mailhos C, Ju M, et al. Inhibition of platelet-derived growth factor B signaling enhances the efficacy of anti-vascular endothelial growth factor therapy in multiple models of ocular neovascularization. *Am J Pathol* 2006; 168:2036-53.
10. Husain D, Kim I, Gauthier D, et al. Safety and efficacy of intravitreal injection of ranibizumab in combination with verteporfin PDT on experimental choroidal neovascularization in the monkey. *Arch Ophthalmol* 2005; 123:509-516.
11. Avery RL, Pieramici DJ, Rabena MD, et al. Intravitreal bevacizumab (Avastin) for neovascular age-related macular degeneration. *Ophthalmology* 2006;113:363-72.