

Case Report

Intravitreal bevacizumab for choroidal neovascularization secondary to angioid streaks: A report of two patients

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Abstract

The aim of this study is to report clinical course of choroidal neovascularization secondary to angioid streaks (AS) in two patients who underwent intravitreal bevacizumab therapy. Fundus examination, fluorescein angiography (FA) and optical coherence tomography (OCT) revealed the diagnosis of subfoveal classic choroidal neovascularization (CNV) in the right eye in patient 1 and in the left eye in patient 2. After three consecutive bevacizumab injections, visual acuity improved from 20/40 to 20/25 in patient 1 and from 20/80 to 20/50 in patient 2. After 3 months of therapy, additional bevacizumab injection was administered when the lesion showed recurrence. After a follow-up time of 24-months, patient 1 received 14 intravitreal bevacizumab injections; patient 2 received only 4 injections. Visual acuities remained stable at 20/32 and 20/50 in patient 1 and patient 2, respectively. Though, the patients of CNV secondary to AS showed similar clinical appearance at the beginning, this report provides the data for different responses to intravitreal bevacizumab therapy. While fewer injections were required to control the disease in one patient, the other patient needed much more injections for stabilization of the CNV. Further studies are required to understand the cause of varied treatment responses in those patients.

Keywords: Angioid streaks, Choroidal neovascularization, Bevacizumab

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Introduction

Angioid streaks (AS) were first reported by Doyne¹ in 1889 in a patient who had suffered from retinal hemorrhage secondary to trauma. Knapp first used the term of 'angioid streaks' because their appearance suggested a vascular origin.² Later, the histopathological findings revealed that the underlying abnormality was structural alterations in Bruch's membrane rather than a vascular pathology. They are described as lesions with irregular lines radiating from the optic nerve head to the peripheral retina and result from rupture or dehiscence of a calcified and brittle Bruch's membrane between the retinal pigment epithelium and the choroid.³

Angioid streaks may accompany many systemic diseases, such as pseudoxanthoma elasticum, Paget's disease,

Ehler–Danlos syndrome, and hemoglobinopathies. Ocular findings of angioid streaks include bilateral, narrow, jagged lines radiating from the optic nerve to the peripheral retina, peau d'orange pigmentary pattern in the retina and secondary choroidal neovascularization.³ The aim of this study is to present two patients of choroidal neovascularization secondary to angioid streaks, both associated with pseudoxanthoma elasticum.

Case reports

Case 1

A thirty-seven-year-old male patient presented with blurred vision in the right eye and a decrease in vision in

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the left eye in 2010. Systemic evaluation showed several yellow skin papules and plaques located laterally on his neck and arm pits. His family history was not significant. On ocular examination, best corrected visual acuity (BCVA) was 20/40 in his right eye and 20/800 in his left eye. Slit lamp examination of the anterior segment did not show any abnormality. Intraocular pressure was within normal limits in both eyes. Fundus examination revealed peripapillary angioid streaks branching radially from the optic disk and peau d'orange pigmentary pattern in both eyes. A grayish subfoveal lesion surrounded by subretinal hemorrhages in his right eye, and disciform scarring were noticed in the left eye (Fig. 1). Fundus fluorescein angiography (FA) showed window defect hyperfluorescence in both his eyes at the areas in correspondence with angioid streaks, a subfoveal classic choroidal neovascularization associated with leakage and hemorrhages in his right eye and a subfoveal classic CNV scar in his left eye. Optical coherence tomography (OCT) revealed subfoveal classic CNV associated with subretinal fluid collection in the right eye (Fig. 2), and a classic CNV scar in the left eye. The central retinal thickness was 261 and 140 microns, respectively in the right and left eye. Based on ocular and dermatologic findings, the patient's diagnosis was thought to be pseudoxanthoma elasticum and he was referred to the dermatology clinic. Pathologic examination of the skin biopsy specimen from his neck showed deposition of calcium and degenerated, clumped, fragmented elastic fibers staining with Verhoeff-van Gieson stain in the deep reticular dermis, confirming the diagnosis of pseudoxanthoma elasticum. The patient was also referred to gastroenterology, and to cardiology clinics for preventive care. Gastroscopic, colonoscopic, and cardiac evaluation were normal. At each follow-up visit, measurement of BCVA and intraocular pressure and, OCT evaluation were performed. FA was performed when needed. As initial therapy, the patient received three consecutive 1.25 mg/0.5 mL intravitreal bevacizumab injections every 4 weeks in the right eye. After three consecutive bevacizumab injections, BCVA in the right eye improved from 20/40 to 20/25, OCT showed absence of subretinal fluid, and CMT was decreased from 261 to 188 microns. At 6 month's visit, BCVA decreased from 20/25 to 20/32 and OCT revealed subretinal fluid (Fig. 3); an additional bevacizumab injection was given. After the 4th intravitreal injection, BCVA remained stable at 20/32 and OCT showed absence of subretinal fluid. Additional treatment was administered when the lesion showed subretinal or intraretinal fluid on OCT, leakage on FFA, intraretinal or subretinal hemorrhage in the examination, or when a decreasing visual acuity was



Figure 1. Color fundus photograph of patient 1. Peripapillary angioid streaks branching radially from the optic disk are seen in both of the eyes (OD and OS). The white arrow points the grayish subfoveal choroidal neovascularization in the right eye, white stars point the subretinal hemorrhages around the macula (OD). There is a disciform scarring at the macula on the left eye (OS).

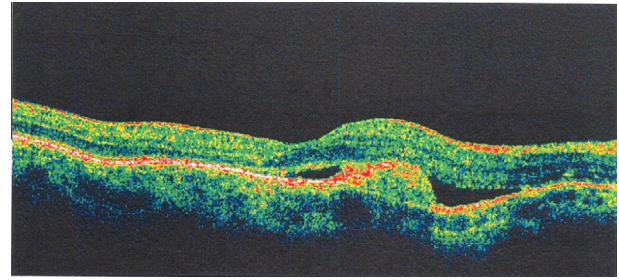


Figure 2. Optical coherence tomography scan demonstrates a hyperreflective subfoveal choroidal neovascular membrane with subretinal fluid before therapy.

detected. After a follow up period of 24 months the patients received a total of 14 intravitreal bevacizumab injections and BCVA was measured 20/32. OCT did not show subretinal fluid either (Fig. 4). No serious adverse events related to intravitreal injection of bevacizumab occurred.

Case 2

A forty-four-year-old female patient presented to our clinic with a decrease in vision in her left eye in August 2010. Systemic evaluation showed several yellow skin papules and plaques located laterally on her neck and arm pits. She did not have any other systemic diseases. On ocular examination, BCVA was 20/25 in the right eye and 20/80 in the left eye. Slit lamp examination of the anterior segment did not show any abnormality. Intraocular pressure was within normal limits in both eyes. Fundus examination revealed peripapillary angioid streaks branching radially from the optic disk in both eyes; mild pigmentary changes at the macula in the right eye, a grayish subfoveal lesion and scarring in the left eye (Fig. 5). FA showed a window defect hyperfluorescence in both her eyes at the areas in correspondence with angioid streaks, a subfoveal classic choroidal neovascularization associated with leakage and in the left eye. OCT did not reveal any abnormality in the right eye; however, a subfoveal classic CNV associated with minimal subretinal fluid collection was detected in the left eye. The central retinal thickness was 147 and 195 microns, respectively in the right and left eye. Follow-up examinations were carried out one week after the intravitreal injections and then monthly for follow-up period. For each visit, BCVA and intraocular pressure were measured and, side effects and complications resulting from intravitreal injection were assessed. While OCT was performed in each visit, FA was used as needed. As initial therapy, the patient received three consecutive intravitreal

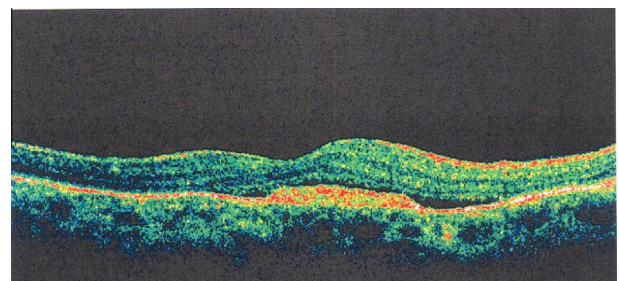


Figure 3. Optical coherence tomography reveals the recurrence of choroidal neovascular membrane activity with minimal subretinal fluid collection at 6 months' visit.

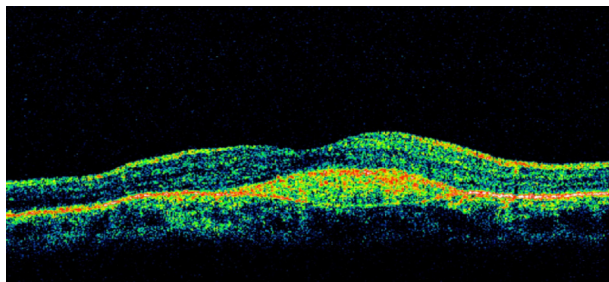


Figure 4. Optical coherence tomography shows choroidal neovascular membrane and absence of subretinal fluid collection at 24 months of therapy.

bevacizumab injections of 1.25 mg/0.5 mL. After three consecutive bevacizumab injections, BCVA in the right eye improved from 20/80 to 20/50, OCT showed absence of subretinal fluid, and CMT was decreased from 195 to 154 microns. Additional treatment was administered when the lesion showed subretinal or intraretinal fluid on OCT, leakage on FA, intraretinal or subretinal hemorrhage in the examination, or when a decreasing visual acuity was detected. After a follow up period of 24 months, the patient received a total of four intravitreal bevacizumab injections and BCVA was stable at 20/50 and OCT did not show subretinal fluid. No injection related serious ocular and systemic complications were observed.

Discussion

The hallmark of AS, results from degeneration and calcification of the elastic fibers in Bruch's membrane which leads to multiple breaks. These breaks may cause CNV, subretinal hemorrhages, retinal hemorrhages, and visual loss.⁴ Usually, the first sign of the angioid streaks is peau d'orange and it may be seen even 10 years before the formation of angioid streaks.^{3,4} The visual acuity remains unchanged unless a break or a CNV affects macula. There is no proven effective therapy for breaks yet; however, CNV may be treated with laser photocoagulation, intravitreal anti-VEGF injections and photodynamic therapy.³⁻⁵ Cekic et al.,⁶ reported that intravitreal pegaptanib sodium was effective in preventing visual acuity loss in five eyes of four patients after a median follow-up time of 18 months. They also noted that two of the eyes had a visual improvement. In a retrospective study by Wiegand et al.,⁷ it is reported that intravitreal bevacizumab injection was effective in preventing visual loss in 88.8% patients with CNV secondary to angioid streaks. In a study which had a mean follow-up time of 23.8 months by Neri

et al.,⁸ it is cited that all 11 patients remained stable or had improved vision. In two case reports; Nika et al.⁴ and Japiassu et al.⁹ reported successful results with intravitreal bevacizumab in CNV secondary to angioid streaks. Intravitreal ranibizumab injection and combination treatments (PDT and intravitreal anti-VEGF injection) are the other treatment modalities which are used for the treatment of CNV secondary to angioid streaks.^{5,9} Finger¹⁰ reported successful results with intravitreal ranibizumab in a case series of 7 patients. Prabhu et al.⁵ reported that combination treatment of low fluence PDT and intravitreal ranibizumab injection was effective for choroidal neovascularization secondary to AS in a case report.

Choroidal neovascularizations are usually associated with sudden visual loss. Intravitreal anti-VEGF treatment is an effective treatment option for the CNVs associated with AS and proven effective up to 2 years.⁵⁻¹⁰ The natural course of AS is similar to age-related macular degeneration, because the disease has a progressive nature.³ In this study we presented two different angioid streaks patients.

Both patients suffered from CNV secondary to pseudoxanthoma elasticum. Interestingly, the first patient had a chronic and unfavorable clinical course requiring many intravitreal injections; however, the second patient had a better clinical course requiring very few intravitreal injections. In the light of these findings, bevacizumab appears to be a safe and effective treatment for CNV secondary to AS. Future studies are required to validate these findings and to understand patient characteristics which could affect the treatment response.

Conflict of interest

The authors declared that there is no conflict of interest.

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Figure 5. Color fundus photograph of patient 2. Peripapillary angioid streaks branching radially from the optic disk are seen in both of the eyes (OD and OS). The white arrow points the grayish subfoveal choroidal neovascularization in the left eye (OS).