Intravitreal Bevacizumab for Choroidal Neovascularization Secondary to Angioid Streaks

Angioid streaks (AS) are irregular ruptures of the Bruch membrane that typically radiate from the optic disc. Through these cracks, new blood vessels may proliferate, generating choroidal neovascularization (CNV), which represents the main cause of visual loss in these patients. Laser photocoagulation has been widely used both to stop CNV and to stabilize visual acuity (VA) in patients with AS. The high rate of recurrences and functional problems related to the expansion of CNV or laser-induced scar toward the fovea have encouraged the evaluation of different treatment options. Photodynamic therapy (PDT) with verteporfin has been used to limit or delay visual damage caused by this aggressive disease, but its efficacy on macular function seems to be limited to a short period.

Vascular endothelial growth factor (VEGF) has been implicated in several diseases of the eye in which neovascularization and increased vascular permeability occur; thus, drugs inhibiting the VEGF bioactivity may provide a novel therapeutic option. Off-label use of intravitreal bevacizumab (IVB) has been introduced in the treatment of neovascular age-related macular degeneration, cystoid macular edema, neovascular glaucoma, pathologic myopia, and CNV due to AS. While the long-term safety and efficacy of IVB use have yet to be ascertained, these short-term results suggest that IVB use may represent an advantageous approach in the management of these pathologic conditions.

Herein we report on the clinical course of 5 patients with subfoveal CNV secondary to AS treated with IVB and followed up for 3 to 9 months.

Report of Cases. Our study population consisted of 5 patients with AS (1 woman, 4 men) with a mean (SD) age of 53.8 (7.52) years, all with skin biopsy–proven pseudoxanthoma elasticum. Two patients (2 and 5) had been previously treated with PDT; patient 2 was treated twice. Intravitreal bevacizumab therapy was proposed because of episodes of relapse. The other 3 patients (1, 3, and 4) had not received any treatment prior to IVB therapy. Table 1.

All patients received a complete ophthalmologic evaluation. No signs suggestive of age-related macular degeneration were found. Fluorescein (FA) and indocyanine green angiography criteria included evidence of leakage caused by CNV secondary to AS. Intravitreal bevacizumab treatment was recommended for (1) symptomatic lesions (recent decrease in VA and/or metamorphopsia); (2) presence of leakage on FA and indocyanine green angiography criteria included evidence of leakage caused by CNV secondary to AS; and (3) presence of intraretinal or subretinal fluid documented by optical coherence tomography. All patients gave their written informed consent to the treatment (bevacizumab, 1.25 mg in 0.05 mL).

Follow-up visits were carried out 1 week after the treatment and then monthly for 9 months. Two patients (4 and 5) received 2 injections at 6-week intervals (Table 1). At the last check, mean CRT reduction was 41.6 µm (range, 54-20 µm), with a mean thickness of 299.6 µm (range, 218-340 µm) (Table 2).
corrected VA (BCVA) at baseline ranged from 10/160 to 10/16. Baseline BCVA in patient 1 was 10/50 and reached a value of 10/16 3 months later. At the beginning of the study, patients 2 and 5 (treated with PDT) had BCVAs of 10/160 and 10/100, respectively. One week after IVB injection, their BCVAs increased to 10/100 and 10/25, respectively, and this result was stable up to the end of follow-up. One week after the injection, the BCVA of patient 3 increased from 10/32 to 10/22; at the end of the follow-up (6 months), his BCVA further improved to 10/10. The BCVA of patient 4 quickly improved from 10/16 to 10/10. This patient was monitored for 9 months, and at the last follow-up check, his BCVA was 10/12.5 (Table 2).

Angiographic examinations showed a decreased CNV leakage in all patients, whereas the CNV size did not show significant variation over the follow-up period (Table 3). Lastly, neither systemic nor local adverse effects were reported following IVB injection.

**Comment.** Current available laser treatments for CNV secondary to AS have a poor outcome. This might be because of the high angiogenic activity present in CNV, which could be worsened by the VEGF stimulation and up-regulation induced by the treatment itself. These data support IVB use in the management of CNV due to AS. In our experience, IVB injection did not modify the CNV size, whereas an increase in final lesion size in CNV due to AS has been reported after PDT.2 In our small series of patients, FA leakage diminished in patients 1, 3, and 5 and was completely absent in patients 2 and 4. A reduction of CRT was recorded in all subjects. This change of retinal morphology is likely to be the result of a combined antiangiogenic effect due to the decrease of vessel permeability and the antiproliferative effect due to the inhibition of further CNV growth following the VEGF blockage.3 The smallest reduction was recorded in the 2 patients who had previously undergone PDT. These anatomical improvements were associated with concomitant increases in VA (a mean of 3–4 lines). The mechanism of this outcome remains uncertain.

A previous case report of CNV due to AS treated with IVB by Teixeira and coworkers6 shows an improvement of the patient’s BCVA. Posttreatment optical coherence tomography and FA imaging showed no presence of subretinal fluid or leakage, respectively. Our data seem to confirm the efficacy and safety of anti-VEGF therapy in eyes with CNV secondary to AS, although we realize that the present study has some limitations, including the limited number of patients and the short period of follow-up. Nevertheless, considering the relative rarity of the disease, it would be difficult to conduct randomized controlled trials, which require a higher number of patients with CNV secondary to AS.

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