Choroidal Osteoma with Neovascular Membrane Managed with Aflibercept and Yellow Laser

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Introduction

Choroidal osteoma (CO) is a benign and rare tumor that is composed by mature bone cells and is more prevalent in females in the second decade of life [1]. CO is often located in juxtapapillary or macular region and is unilateral in the most of cases [2]. The most common complication of CO is choroidal neovascularization (CNV) occurring in up to 31% of cases [3]. CNV is an important cause of visual loss in patients with CO. Decalcification and serous retina detachment can be other causes of visual impairment due this tumor [4]. OCT plays fundamental role in the diagnosis and follow up of a large amount of retinal and choroidal diseases, including CNV. It has been used to evaluate singular characteristics of choroidal tumors throughoptical coherence tomography enhanced depth imaging (OCT-EDI) [5] and vascular abnormalities by the OCT-angiography (OCTA) [6].

The intravitreous injection of anti-vascular endothelial growth factor (anti-VEGF) is an effective treatment for CNV, mainly when it is subfoveal [7]. Aflibercept, a new anti-VEGF agent, has shown efficacy to those patients who are non-responders to ranibizumab and bevacizumab in CNV associated with age-related macular disease (AMD) [8]. Similarly, the laser therapy using the yellow laser (577nm) reduces the damage of surrounding retina and of retinal pigment epithelium (RPE) cells [9], allowing a safer treatment of CNV in the macula, except in the fovea region. Herein, we report a case of a patient with CO-associated CNV documented by OCTA and successfully treated by intravitreal aflibercept injections and yellow laser therapy.

Case Report

A 19-year-old caucasian male presented with a dark spot on temporal field of the left eye with one month of evolution. Examination of the ocular fundus of the left eye revealed a well-circumscribed and elevated orange-yellow plaque underneath the retina around the optic disc and subretinal hemorrhages in the macular region. The patient was submitted to fluorescein angiography, ocular ultrasound, optical coherence tomography (OCT) and optical coherence tomodraphy angiography (OCTA), then diagnosed with choroidal osteoma associated with neovascular membrane. He was treated with a series of 3 intravitreal aflibercept injections and submitted to yellow laser. One month after the procedure, visual acuity was 20/20 and the neovascular membrane had regressed.

Methods

A 19-year-old male patient with a choroidal osteoma associated with CNV was referred for treatment. OCTA showed a well-defined choroidal plaque with a corresponding area of subretinal hyperreflectivity and a thin area of sub-RPE hyperreflectivity. The patient was treated with 3 intravitreal aflibercept injections and yellow laser therapy. One month after the procedure, visual acuity was 20/20 and the neovascular membrane had regressed.

Discussion

The management of choroidal osteoma with CNV is challenging. Aflibercept and yellow laser therapy can be used as a treatment option. OCTA can be used to monitor the disease and evaluate the response to treatment.

Conclusions

The use of aflibercept and yellow laser therapy in choroidal osteoma associated with CNV is an effective treatment option.

Keywords: Anti-VEGF therapy; Choroidal neovascularization; Choroidal osteoma; Yellow laser therapy

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Abbreviations:
CO: Choroidal Osteoma; OCT: Optical Coherence Tomography; OCTA: Optical Coherence Tomography Angiography; CNV: Choroidal NeoVascularization; Anti-VEGF: Anti-Vascular Endothelial Growth Factor; OCT-EDI: Optical Coherence Tomography-Enhanced Depth Imaging; AMD: Age-related Macular Disease; RPE: Retinal Pigment Epithelium; FFA: Fundus Fluorescent Angiography; SD-OCT: Spectral Domain Optical Coherence Tomography; PDT: Photo Dynamic Therapy
Figure 1: Color photograph of a choroidal osteoma with associated choroidal neovascularization. The neovascularization is located on the juxtafoveal, and subretinal hemorrhage are noticed around it.

Figure 2: FA of the left eye showed early hyperfluorescence and intense staining of the choroidal lesion associated with areas of blockage corresponding to sub retinal hemorrhage.

Figure 3: Ultrasound image of the left eye posterior pole showing calcified plaque corresponding to osteoma with highly echogenic lesion and posterior acoustic shadowing.

In the SD-OCT the osteoma was a well defined choroidal lesion with a sponge-like appearance because of the presence of multiple hyperreflective dots scattered among a hyporeflective mass (Figure 4). The angiogram shows the tumor’s vessels in the superficial vascular plexuses, and the intra-retinal hemorrhage in the En face OCT. The osteoma showed no flow in the choriocapillaris layer (Figure 5). The diagnosis of CO complicated by CNV was confirmed, which was responsible for the intra-retinal hemorrhage. The patient underwent three consecutive monthly intravitreal injections of aflibercept (2.0mg). One month after all intravitreal aflibercept injections, OCTA showed that abnormal vascular signal was absent in the outer retina and choriocapillaris layers (Figure 6).

Color fundus photograph, B-scan ultrasound, fundus fluorescent angiography (FFA), spectral domain optical coherence tomography (SD-OCT) (Heidelberg Engineering, Heidelberg, Germany) and optical coherence tomography angiography (OCTA) (Optovue, Inc., Fremont, CA, USA) were performed. FFA of the left eye showed early hyperfluorescence and intense staining of the choroidal lesion associated with areas of blockage corresponding to subretinal hemorrhage (Figure 2). The B-scan ultrasonography revealed a highly echogenic lesion with posterior acoustic shadowing (Figure 3).

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In addition, yellow laser photocoagulation was performed at the temporal margin of the tumor in order to avoid membrane recurrence (Figure 7). The final visual acuity of the patient was 20/20 and there was improvement of visual field defect in the left eye after two months of treatment.
Biologic qualities of aflibercept make this molecule potentially superior to ranibizumab and bevacizumab. Moreover, the fusion protein, approved in November 2011 by the Food and Drug Administration for the treatment of neovascular AMD. Differently than ranibizumab and bevacizumab, which bind selectively to VEGF-A only, aflibercept targets VEGF-B, and placental growth factor (PGF) as well. These properties lead to superior affinity for VEGF, compared to ranibizumab and bevacizumab. Moreover, the biologic qualities of aflibercept make this molecule potentially more efficient in the long-term control of neovascular activity, allowing less frequent re-injections, as supported by clinical trials [11].

In this case report, the patient was submitted to three consecutive monthly intravitreal injections of aflibercept (2.0mg). Analysis of magnified EDI-OCT images reveals a typical sponge-like pattern comprised of dense hyperreflective dots spread into hyporeflective matrix and a multilayer structure, likely because of the presence of different degrees of calcification within the tumor. It is believed that SD-OCT scan in eyes with an amelanotic lesion in the fundus can facilitate clinicians in differentiating choroidal osteomas from other conditions, such as sclerotic calcifications, choroidal melanomas, choroidal metastasis and choroidal lymphoma [12].

The OCTA has the advantage of varying the segmentation and scrolling through the different retinal layers, and layer-specific observation of blood flow in each layer. In addition, OCTA can measure the vessel area change of CNV and provide a better appreciation of CNV, observing the efficacy more elaborately and quantitatively. OCTA makes promising non-invasive identification of the CO-related CNV. OCTA was implemented to differentiate tumor’s vessels from choroidal neovascularization [13].

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