

Sequential Anti-VEGF Therapy for Recurrent Choroidal Neovascularization Secondary to Choroidal Osteoma: A Case Report

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ABSTRACT

Choroidal osteoma is a rare benign ossifying choroidal tumor associated with vision-threatening complications, most commonly choroidal neovascularization (CNV). CNV secondary to choroidal osteoma can be difficult to manage due to high recurrence rates and variable response to treatment. A 35-year-old woman presented with curtain-like superotemporal visual field loss in her right eye without associated visual acuity loss. Upon examination, best-corrected visual acuity was 6/6 OU. Multimodal imaging confirmed the diagnosis of choroidal osteoma with secondary CNV. Patients initially responded well to sequential intravitreal anti-vascular endothelial growth factor (anti-VEGF) therapy; however, recurrence of CNV required switching treatment modalities to a newer-generation anti-VEGF agent. Five months after the treatment switch, the patient was asymptomatic with stable examination findings. Multimodal imaging allowed for confident diagnosis while newer-generation anti-VEGF agents appeared successful in managing recurrent CNV secondary to choroidal osteoma.

Keywords: Choroidal Osteoma, Choroidal Neovascularization, Aflibercept, Faricimab, Imaging, Choroid.

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INTRODUCTION

Choroidal osteoma is a rare benign ossifying tumor of choroid that was first described by Gass in 1978.¹ It usually affects young females and is predominantly unilateral. Although majority of the patients are asymptomatic during early course of disease due to slow growth of tumor, however CNV is the most common cause for vision loss which occurs in 31–47% of cases.² CNV can occur due to decalcification of tumor or degeneration of overlying retinal pigment epithelium (RPE). After introduction of anti-VEGF

treatment, visual prognosis has significantly improved but problem of recurrence still exists, making management challenging.

Case Presentation

A 35-year-old female patient with no past medical or ocular history presented with complaint of distorted vision in right eye for three days which was associated with headache and pressure effect on right side of head. Despite having these symptoms her vision was not affected. Visual acuity was 20/20 in both eyes with no correction. Anterior segment examination was unremarkable with no signs of inflammation or media opacity and no RAPD. However, the patient had distortion on Amsler grid examination of right eye with corresponding scotoma in superotemporal field.

On fundus examination of the right eye, there was a well-defined yellow white to orange lesion seen at posterior pole along inferior arcade with dull foveal reflex. Left eye examination was unremarkable.

Optical Coherence Tomography (OCT) revealed hyper reflective lesion in choroid with posterior shadowing. There were subretinal fluid and disruption in outer retinal layers. Fundus Fluorescein Angiography (FFA) showed early hyper fluorescence in area of CNV lesion with progressive leakage in late phases, along with staining of lesion consistent with osteoma. B-Scan Ultrasound revealed highly echoic lesion in choroid with posterior acoustic shadowing. Computed Tomography (CT) of orbit showed hyper dense lesion in choroid exhibiting plaque like calcification over posterior pole of right eyeball which measured 4.2×2.5 mm (L×W). Figures 1 and 2 show the details.

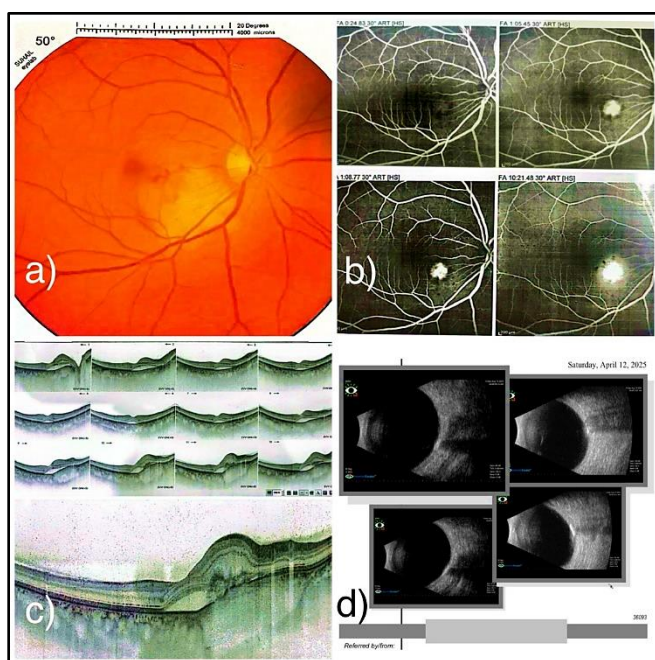


Figure 01: a): Color Fundus Photograph (OD) showing a well-demarcated, yellow-white to orange lesion located in the posterior pole along the inferotemporal arcade with a streak of intra-retinal bleed at the upper border of lesion. b) FFA, early-phase shows subtle hyper fluorescence progressing into a lacy pattern due to leakage corresponding to the CNV complex. c) SD-OCT scans show breach at the RPE with Sub-retinal fluid (SRF) along with the well-defined hyper-reflective oval shaped lesion at the level of choroid. d) B-scan revealing a highly reflective choroidal lesion with marked posterior acoustic shadowing (dual optic nerve head shadow) characteristic of calcified tissue.

The differential diagnoses were Amelanotic Choroidal Melanoma (Low-to-medium internal reflectivity on B-scan and no dense calcification on CT) which was ruled out due to high reflectivity and calcification and Choroidal Hemangioma (Orange-red lesion but no calcification and demonstrates different FFA pattern with early hyper fluorescence without late

leakage pattern of CNV) which was ruled out by the imaging pattern. Metastatic Lesions are creamy, often bilateral and associated with known cancer elsewhere in the body. The final diagnosis was Choroidal osteoma with secondary CNV.

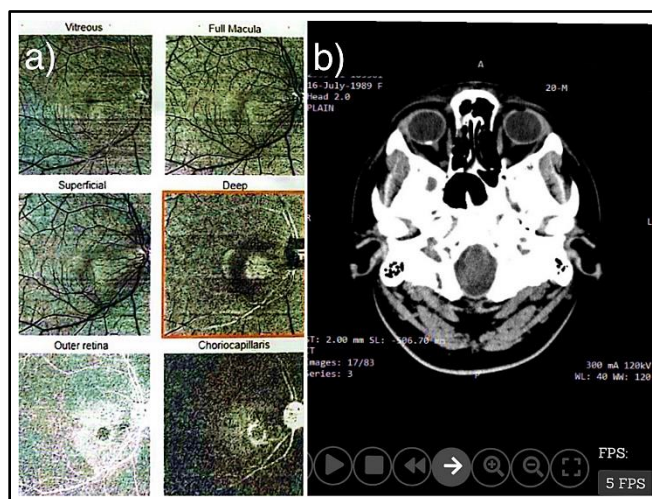


Figure 02: a): En face OCTA outer retinal slab showing abnormal flow signal consistent with neovascularization. Choriocapillaris slab demonstrating flow voids and an abnormal vasculature complex consistent with CNV. b) Axial CT scan of the orbit showing a well-defined hyperdense lesion in the choroid of the right eye, consistent with ossification.

Patients were initially treated with a loading dose of three intravitreal Aflibercept (2 mg/0.05 ml) injections at one month interval, which gave a good anatomical and symptomatic response (Figure 03-a). Four months following the initial loading dose, the patient presented with recurrence of symptoms which were confirmed on imaging (Figure 03-b). We proceeded with another injection of Aflibercept. Patient remained asymptomatic for the next one month when she presented again with the same symptoms (Figure 04). We switched her from Aflibercept to Intra-vitreous injection of Faricimab (6 mg/0.05 ml). Adjunctive posterior sub-Tenon (PST) injection of triamcinolone acetonide (Kenacort) was also given at this time. The patient remained asymptomatic for 6 months following her last treatment (Faricimab + PST Kenacort) with resolution of subretinal fluid on OCT with stable characteristics of lesion (Figure 05).

DISCUSSION

Choroidal osteoma is an uncommon choroidal tumor that predominantly affects females. Unfortunately,

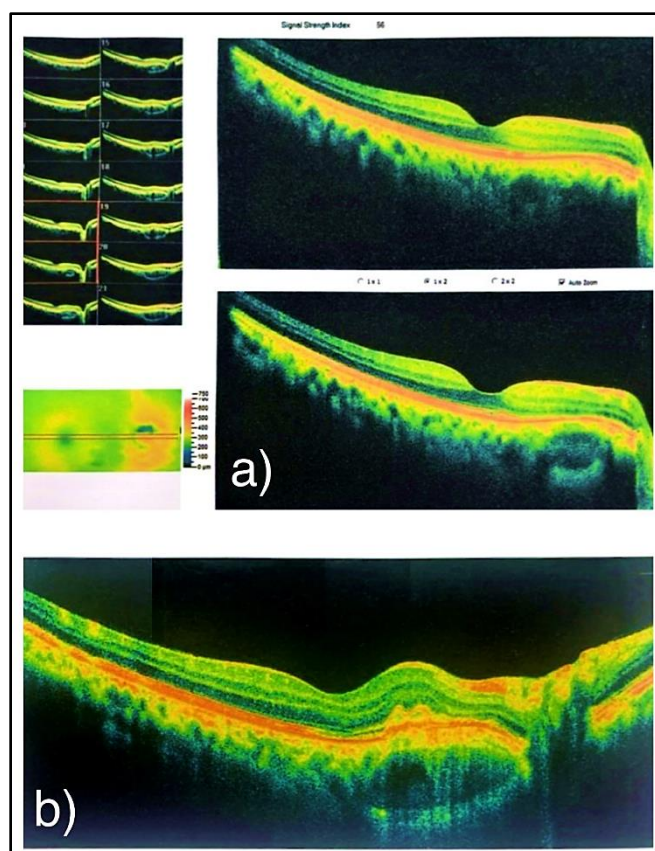


Figure 03a):SD-OCT Right Eye after loading dose of 3x monthly intravitreal Anti-VEGF Aflibercept Injection. **b)** Raster SD-OCT (OD) highlighting recurrence of neovascular complex 4 months after the initial loading dose.

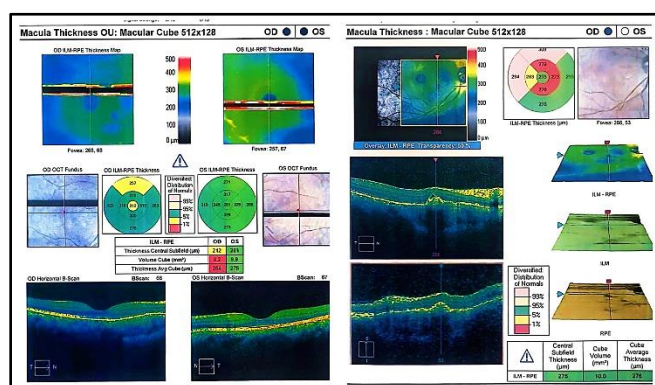


Figure 04: The Follow-up Macular cube analysis showing ILM-RPE thickness maps of both eyes. Right eye demonstrates decreased amount of SRF with restoration of foveal contour after intravitreal Aflibercept injection following 1st recurrence (left OCT scan).SD-OCT Right Eye at 2nd Recurrence (right OCT scan).

vision loss can occur during natural course of disease due to development of CNV. Pathogenesis of CNV development likely results from degeneration of overlying RPE and Bruch's membrane allowing for

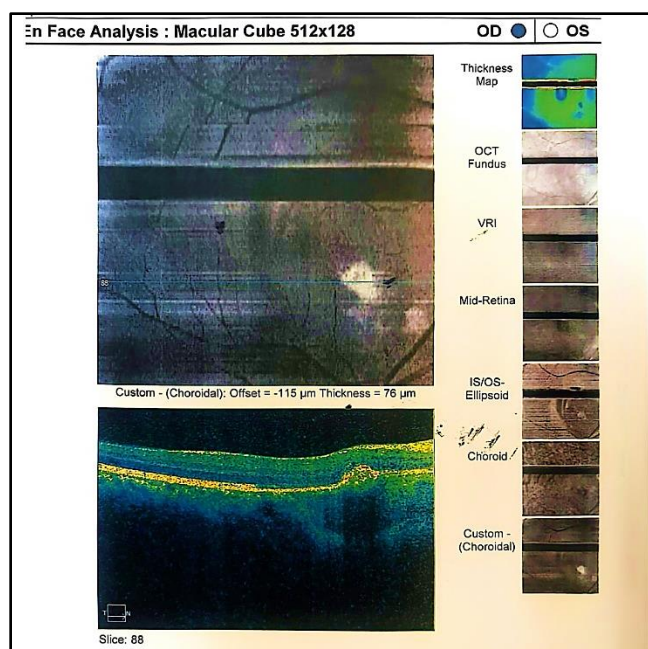


Figure 05: Current follow-up OCT of the right eye after intra-vitreal Faricimab injection + PST Kenacort injection.

vascular proliferation.² Previously used treatment modalities such as laser photocoagulation and photodynamic therapy have shown limited results secondary to difficulty targeting lesion and increased recurrence. Anti-VEGF injections have provided new management options with CNV including secondary to choroidal osteoma.³⁻⁵ Although cost-effective bevacizumab has shown higher recurrence rates. Past studies have shown potential benefit of intravitreal aflibercept for choroidal osteoma in cases with suboptimal response to bevacizumab or ranibizumab and for management of associated subretinal fluid.^{4,5} Taken together with our case, these findings indicate that sequential use of anti-VEGF medications with switching to Faricimab be a reasonable strategy for recurrent or resistant cases, though more investigation is warranted to determine the appropriate role.³ Aflibercept binds both VEGF-A with higher affinity than bevacizumab with better durability.^{4,5} Faricimab is newer anti-VEGF agent that not only targets VEGF but also angiopoietin-2 pathway which helps with inhibition of both angiogenesis and inflammation thus possibly improving outcomes with treatment.³

This case highlights the issue of recurrence of CNV and need for sequential treatment strategies with intravitreal injections. Need to switch from one medication to another could be due to tachyphylaxis or incomplete response which supports new literature

showing better outcomes with newer medications such as faricimab.³ Liu et al, demonstrated that anti-VEGF therapy, with adjunctive sub-Tenon triamcinolone acetonide, can be effective in managing choroidal neovascularization associated with inflammatory chorioretinal disease, supporting the role of tailored combination therapy in refractory CNV.⁶

Multimodal imaging allowed us not only to diagnose lesion but also to follow up on disease activity and help tailor our treatments moving forward.^{7,8} Persistence and recurrence of CNV also highlights need for prolonged follow-up with these patients.

The main limitations of this case report are relatively short follow-up period, which limit the generalizability of the findings and preclude definitive conclusions regarding the efficacy and durability of newer-generation anti-VEGF therapy for recurrent CNV secondary to choroidal osteoma. The favorable response observed after switching treatment modalities may not be reproducible in other patients, particularly given the variable natural history and recurrence patterns of CNV associated with choroidal osteoma. In addition, the absence of a comparator treatment and the sequential use of different anti-VEGF agents make it difficult to determine whether the observed improvement was attributable specifically to the newer-generation agent.

CONCLUSION

CNV remains the most vision threatening complication of choroidal osteoma which can occur even in patients with good vision. Combining OCT, autofluorescence, and angiographic imaging improves assessment of osteoma activity and associated CNV. Sequential use of anti-VEGF injections can be used to treat recurrent disease and newer generation anti-VEGF injections such as Faricimab may provide better durability and control of disease. Longer-term follow-up and larger case series are required to establish the sustained efficacy, safety, and optimal treatment strategy for recurrent CNV associated with choroidal osteoma.

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Conflict of Interest: Authors declared no conflict of interest.

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