



OCULAR MANIFESTATION AS THE INITIAL PRESENTATION IN AIDS – A RARE CASE

Ophthalmology

Dr. Venkata Sai Sweeya.D	Postgraduate, Sri Ramachandra Institute of Higher Education and Research, Chennai, India.
Prof. Radha Annamalai	Professor -Uvea Specialist, Sri Ramachandra Institute of Higher Education and Research, Chennai, India
Dr. Shiju. M. Selvister	Senior Resident -Retina Specialist, Sri Ramachandra Institute of Higher Education and Research, Chennai, India.

ABSTRACT

Background: Ocular manifestations are a common yet often underrecognized complication in individuals with advanced HIV infection, frequently presenting as retinal microvasculopathy. Although this condition is typically asymptomatic, it can occasionally progress to sight-threatening complications such as cystoid macular edema (CME). Early detection and timely management are essential to prevent irreversible vision loss, particularly in immunocompromised patients with severely reduced CD4+ T-cell counts. **Case Presentation:** We report a case a 45-year-old male who was a recently diagnosed PLHA (people living with HIV/AIDS) and a markedly diminished CD4+ count who presented with bilateral, progressive, painless visual decline. Ophthalmologic evaluation, including fundus examination and optical coherence tomography (OCT), revealed bilateral retinal microvasculopathy complicated by clinically significant CME. The patient was promptly initiated on highly active antiretroviral therapy (HAART) and received adjunctive ophthalmic care. A multidisciplinary approach involving both infectious disease and ophthalmology teams resulted in gradual improvement in visual acuity and stabilization of retinal changes. **Conclusion:** This case highlights the importance of maintaining a high index of suspicion for HIV-associated retinal microvasculopathy in patients with advanced immunosuppression presenting with visual symptoms. Prompt ophthalmologic assessment and early initiation of antiretroviral therapy, in coordination with multidisciplinary care, are crucial to preserving visual function and preventing long-term ocular morbidity in individuals living with HIV/AIDS.

KEYWORDS

HIV/AIDS, Retinal microvasculopathy, Cystoid macular edema (CME), CD4+ T-cell count, OCT, HAART.

INTRODUCTION

Human Immunodeficiency Virus (HIV) infection and its advanced stage, acquired immunodeficiency syndrome (AIDS), remain significant global public health concerns. Since the identification of the first cases in 1981, the HIV/AIDS epidemic has profoundly impacted clinical medicine, healthcare delivery, and public health strategies. As of 2024, approximately 40.8 million people [range: 37.0–45.6 million] are living with HIV worldwide, with a global adult prevalence of 0.7% among individuals aged 15–49 years. [1,2]

Ocular manifestations are a recognized but often underappreciated aspect of HIV infection. These can involve both anterior and posterior segments of the eye, with retinal disease being particularly common. HIV-associated retinal microvasculopathy and opportunistic infections—especially cytomegalovirus (CMV) retinitis—are frequently seen in individuals with advanced immunosuppression and low CD4+ T-cell counts. [3,4]

CMV retinitis remains the leading cause of visual loss in patients with late-stage HIV. While the advent of combination antiretroviral therapy (ART) has significantly reduced the incidence of opportunistic infections, retinal complications persist. This continued occurrence may be due to incomplete immune reconstitution, chronic immune activation, or persistent low-grade intraocular inflammation despite viral suppression. [3]

Notably, recent reports have documented retinal pathologies, including CMV retinitis, in patients with CD4+ counts above 200 cells/ μ L. These findings challenge traditional risk thresholds and underscore the need to reassess current ophthalmic screening guidelines. [5, 6] Additionally, immune recovery uveitis (IRU)—an inflammatory condition emerging after ART initiation—has further expanded the spectrum of HIV-related retinal disease.

This case report describes a rare presentation of HIV retinopathy with cystoid macular edema, a feature infrequently reported in the literature. It underscores the importance of comprehensive ophthalmic evaluation in immunocompromised individuals presenting with visual symptoms, even in the absence of profound immunosuppression.

CASE PRESENTATION

A 41-year-old male inpatient was referred to the ophthalmology

department for evaluation of progressive visual disturbances and suspected retinopathy. He reported a two-month history of gradually worsening bilateral vision, associated with photophobia. His past medical history was significant for controlled levels of type 2 diabetes mellitus, hypertension, and chronic kidney disease (CKD) managed with maintenance hemodialysis. He was also a recently diagnosed case of human immunodeficiency virus (HIV) infection (People Living with HIV/AIDS [PLHA]); however, antiretroviral therapy (ART) had not yet been initiated.

On ophthalmologic examination, uncorrected visual acuity (UCVA) was 6/18 for distance and N18 for near in both eyes. Best-corrected visual acuity (BCVA) improved to 6/9, N8 in the right eye and 6/18, N8 in the left eye. Laboratory investigations revealed a CD4+ T-cell count of 173 cells/ μ L, indicating advanced immunosuppression, and a high HIV viral load of 167142 copies/mL.

Fundus examination of both eyes (Figures 1 and 2) showed multiple retinal microaneurysms, cotton wool spots, intraretinal hemorrhages, and macular edema—findings consistent with HIV-associated retinal microvasculopathy. Optical coherence tomography (OCT) (Figures 3 and 4) demonstrated intraretinal and subretinal fluid, retinal thickening, and hyperreflective foci, suggestive of cystoid macular edema (CME).

Management And Follow-Up

The patient was initiated on Highly active antiretroviral therapy (HAART) in coordination with the infectious disease team. Topical anti-inflammatory agents were prescribed to address the visually significant CME. While HIV-associated retinal microvasculopathy is often subclinical and may not necessitate specific ophthalmic intervention, the presence of symptomatic CME warranted targeted ocular management.

A multidisciplinary follow-up plan was established, involving both ophthalmology and infectious disease specialists. Serial ophthalmic evaluations were recommended to monitor therapeutic response, assess for disease progression, and screen for opportunistic ocular infections, given the patient's severely immunocompromised status.

Color fundus photographs of the right eye (left image) and left eye (right image) showing multiple retinal microaneurysms, cotton wool

spots, and intraretinal hemorrhages distributed in the posterior pole. Macular thickening is also noted, suggestive of cystoid macular edema. These findings are consistent with HIV-associated retinal microvasculopathy.

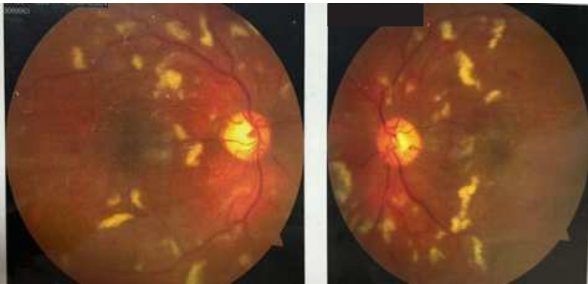


Figure 1. Color Fundus Photography of Both Eyes in a Patient with HIV Retinopathy

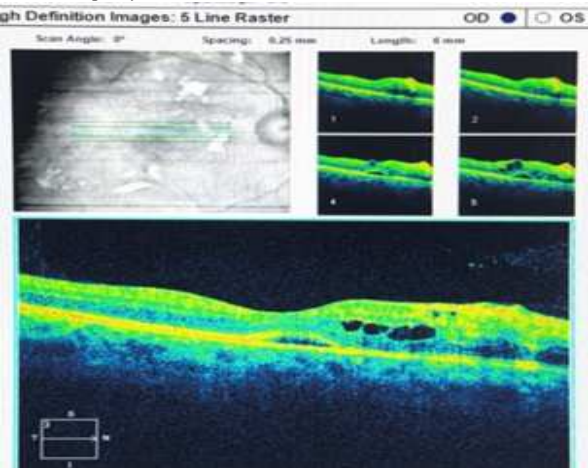


Figure 2. Optical Coherence Tomography (OCT) of the Right Eye Demonstrating Cystoid Macular Edema in HIV Retinopathy

High-definition OCT scan of the right eye (OD) shows intraretinal cystic spaces predominantly within the inner nuclear and outer plexiform layers, along with areas of subretinal fluid and retinal thickening. Hyperreflective foci are visible within the neurosensory retina. These findings are indicative of cystoid macular edema associated with HIV-related retinal microvasculopathy.

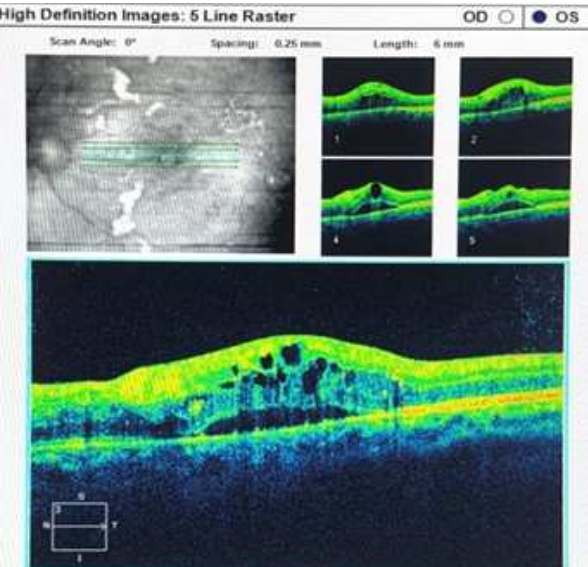


Figure 3. Optical Coherence Tomography (OCT) of the left Eye(OS) Showing Severe Cystoid Macular Edema in HIV Retinopathy

High-definition OCT scan of the left eye (OS) demonstrates extensive intraretinal cystoid spaces involving the central macula, primarily affecting the inner nuclear and outer plexiform layers. There is associated retinal thickening and disruption of the normal foveal

contour. These findings are characteristic of cystoid macular edema and are consistent with HIV-associated retinal microvasculopathy.

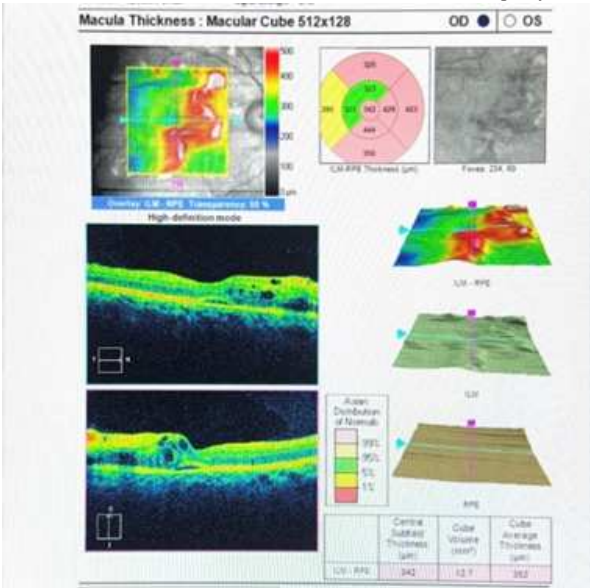


Figure 4. Spectral-Domain Optical Coherence Tomography (SD-OCT) of the Right Eye Demonstrating Cystoid Macular Edema in HIV Retinopathy

Spectral-domain OCT macular cube (512×128) scan of the right eye (OD) shows increased retinal thickness with multiple intraretinal cystoid spaces, predominantly in the parafoveal region. The Early Treatment Diabetic Retinopathy Study (ETDRS) thickness map demonstrates elevation of central subfield thickness (342 µm) and notable thickening in the inner nasal and inner inferior sectors. High-resolution B-scan images reveal foveal contour distortion and prominent cystoid spaces. The 3D retinal topography and color-coded deviation map show values above the normative range (red zones), indicating cystoid macular edema likely attributable to HIV-associated retinal microvasculopathy.

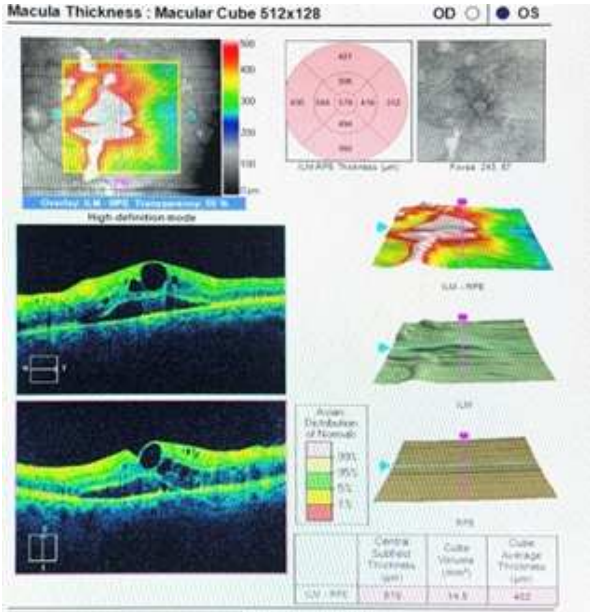


Figure 5. Spectral-Domain Optical Coherence Tomography (SD-OCT) of the Left Eye Showing Severe Cystoid Macular Edema in HIV Retinopathy

Macular cube (512×128) spectral-domain OCT scan of the left eye (OS) displays marked retinal thickening with large intraretinal cystoid spaces and subfoveal hyporeflective cavities. The central subfield thickness measures 579 µm, significantly elevated from normative values. The ETDRS thickness map shows diffuse thickening across all sectors, with the highest values in the inner superior and inner nasal

quadrants. High-resolution B-scans reveal distorted foveal architecture, hyperreflective intraretinal foci, and prominent cystoid macular edema. Color-coded thickness deviation and 3D topographic maps confirm extensive involvement, consistent with advanced HIV-associated microvasculopathy and macular involvement.

DISCUSSION

Ocular manifestations in patients with advanced HIV/AIDS remain a significant cause of morbidity, particularly in resource-limited settings where delayed presentation and limited access to specialized care are common [6]. Among these, HIV-associated retinal microvasculopathy is frequently underdiagnosed due to its typically subclinical presentation [6,7]. However, in rare instances, this microvascular pathology can progress to vision-threatening complications, including cystoid macular edema (CME), as illustrated in our case.

In the present study, we report a 45-year-old male with advanced HIV infection and a markedly reduced CD4+ count, who presented with bilateral, progressive, painless visual loss. Fundoscopic evaluation and optical coherence tomography (OCT) revealed bilateral retinal microvasculopathy complicated by CME. The absence of opportunistic ocular infections such as CMV retinitis, coupled with characteristic OCT findings, supported the diagnosis of non-infectious HIV-associated retinal microvasculopathy. The history and present evidence of controlled blood sugars is an evidence that DM is not a likely cause of macular oedema. Hence we believe that the macular edema is secondary to his systemic infection.

These findings are consistent with the observations of Justiz Vaillant AA et al. (2025) [8], who highlighted that while HIV retinopathy is often asymptomatic, it can progress to significant ocular complications in patients with CD4+ counts below 50 cells/mm³. Similarly, Ambiya V et al. (2012) [3] reported that retinal microvasculopathy in HIV can lead to visual dysfunction, even in the absence of overt infectious retinitis, underscoring the importance of timely diagnosis and intervention.

Although cytomegalovirus (CMV) retinitis remains the most common identifiable cause of visual loss in advanced HIV, our case underscores the importance of considering HIV-associated retinal microvasculopathy as a distinct, vision-threatening entity. Unlike CMV retinitis, which typically presents with full-thickness retinal necrosis and hemorrhagic lesions, HIV retinopathy is characterized by cotton wool spots, microaneurysms, and capillary non-perfusion—features all observed in our patient [3, 9, 10].

Initiation of highly active antiretroviral therapy (HAART) and close ophthalmologic monitoring led to gradual visual improvement and stabilization of retinal changes. This highlights the essential role of multidisciplinary care, involving infectious disease specialists and ophthalmologists, in the early detection and management of HIV-related ocular complications.

In conclusion, this case contributes to the limited but growing body of literature on the progression of HIV-associated retinal microvasculopathy to CME in the absence of opportunistic infections. It emphasizes the need for increased clinical vigilance and routine retinal evaluation in patients with advanced immunosuppression, even in the absence of overt symptoms.

CONCLUSION

This case highlights the ocular complications of advanced HIV infection, particularly HIV-associated retinal microvasculopathy complicated by visually significant cystoid macular edema (CME). Although retinal microvasculopathy often remains asymptomatic, the emergence of symptomatic CME in this severely immunocompromised patient necessitated prompt ophthalmologic evaluation and targeted therapy. Initiation of on highly active antiretroviral therapy (HAART), alongside focused ocular management, underscores the critical role of a multidisciplinary approach in preserving visual function and minimizing the risk of opportunistic ocular infections. Early identification, timely intervention, and coordinated care are essential to preventing irreversible visual morbidity in individuals living with HIV/AIDS—especially those with profoundly low CD4+ counts and delayed initiation of antiretroviral therapy.

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