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Case Report

Bilateral Cryptococcal Choroiditis in a Human Immunodeficiency Virus-Infected Patient: A Case Report

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Keywords
Cryptococcosis · Cryptococcal meningitis · Cryptococcal choroiditis · Choroidal granulomas · Human immunodeficiency virus

Abstract
Introduction: In this case report, we present a rare case of bilateral cryptococcal choroiditis following a diagnosis of meningitis in a 38-year-old woman with HIV. ***Case Presentation:*** A Colombian woman, newly diagnosed with HIV, presented with respiratory distress followed by meningeal syndrome. Further evaluation revealed cryptococcal meningitis caused by *Cryptococcus neoformans*, confirmed through cerebrospinal fluid analysis and brain magnetic resonance imaging. The patient reported mild blurred vision, prompting an ophthalmic examination that included indocyanine green angiography. The findings revealed signs of HIV retinopathy and multifocal choroidal lesions in both eyes, suggestive of choroidal cryptococcosis. Treatment involved intravenous administration of amphotericin B and flucytosine, followed by oral fluconazole. Subsequently, the choroidal lesions gradually regressed, and regular monitoring demonstrated no signs of recurrence. ***Conclusion:*** Cryptococcal choroiditis, though exceptionally rare, can occur in HIV-positive patients with disseminated cryptococcosis. Ophthalmologists should maintain a high index of suspicion for opportunistic infections, even in the absence of pronounced ocular symptoms, particularly in immunocompromised individuals. Early diagnosis and appropriate treatment are crucial for achieving favorable outcomes in such cases.

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Introduction

Cryptococcosis is a rare opportunistic fungal infection primarily observed in immunocompromised individuals, particularly those affected by the human immunodeficiency virus (HIV). The pathogen infiltrates the host through inhalation of encapsulated spores present in contaminated soils. This infection has the capacity to spread hematogenously to various organs, including the central nervous system, leading to mortality rates that can rise from 55% to 70% in developing countries [1, 2]. Approximately 40% of patients suffering from cryptococcal meningitis will manifest ocular involvement, with papillary edema as the predominant clinical sign [3]. Choroidal involvement represents the rarest form of presentation. In this report, we present an exceptional case of bilateral cryptococcal chorioretinitis in a recently diagnosed HIV-positive patient.

Case Presentation

A 38-year-old Columbian woman diagnosed with cryptococcal meningitis following the diagnostic of an HIV infection was referred to our ophthalmology department for fundus examination. The patient was initially admitted due to respiratory distress and received antituberculosis treatment based on suspicions of pulmonary tuberculosis. During treatment, she developed a meningeal syndrome, and cryptococcal meningitis was confirmed through lumbar puncture analysis and brain magnetic resonance imaging. After these findings, it was determined that the patient was indeed afflicted with disseminated pulmonary neoformans cryptococcosis. A treatment involving intravenous administration of amphotericin B in conjunction with intravenous flucytosine was initiated for 2 weeks. Afterward, oral fluconazole treatment was administered at a dosage of 800 mg per day for an 8-week period, followed by a reduction to 400 mg per day for 4 weeks, and then further reduced to 200 mg per day for a duration of 10 months.

The patient did not complain about any ocular symptoms except for slight blurred vision. Visual acuity was assessed at 20/20, intraocular pressure was 17 for the right eye and 16 mm Hg for left eye, and anterior slit lamp examination revealed no remarkable findings. The neuro-ophthalmological evaluation was normal.

Fundus examination revealed the presence of peripapillary Roth spots, a few retinal hemorrhages and cotton-wool spots in both eyes, which were suggestive of HIV retinopathy. Additionally, creamy round multifocal choroidal lesions were observed, which were more prominently visible in the peripheral regions (Fig. 1).

Optical coherence tomography scans were unremarkable. Fluorescein angiography revealed a few areas with masking effect, yet no evidence of hot disk or vasculitis was observed in late frames. Indocyanine green angiography revealed numerous early phase hypocyanescent lesions, which increased in number and became more distinct during the late phase (Fig. 2).

Two months following treatment, the hemorrhages and exudates have completely resolved in the fundus exam. On indocyanine green angiography, the choroidal granulomas have markedly regressed, leaving a few residual hypocyanescent spots (Fig. 3).

Discussion

Cryptococcosis is a potentially life-threatening opportunistic fungal infection primarily caused by two species: *Cryptococcus neoformans* and, less frequently, *Cryptococcus gattii*. It ranks among the most common opportunistic infections in individuals with

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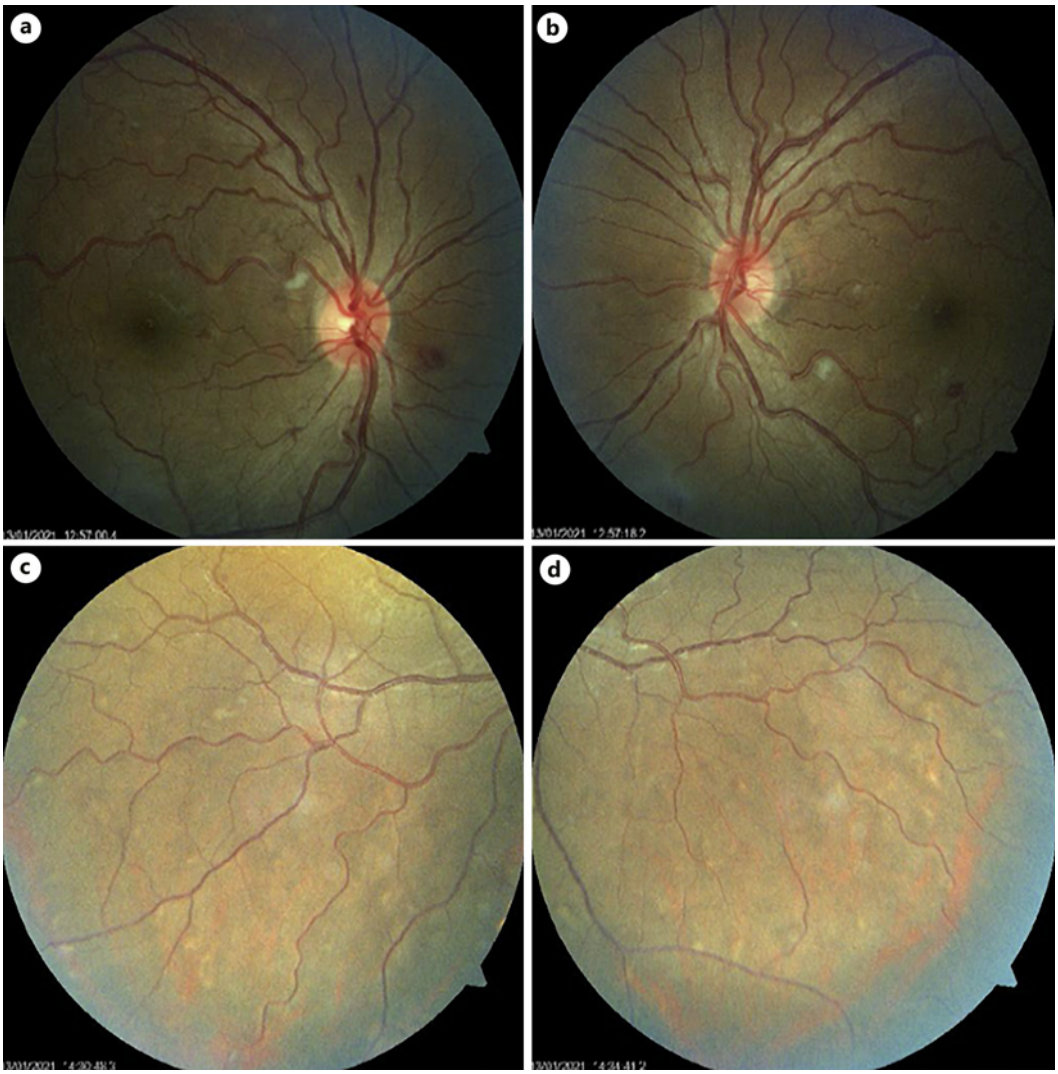

Fig. 1. **a**, **b** Color fundus photographs showing retinal hemorrhages with peripapillary Roth spots associated with cotton-wool spots observed in the posterior pole. **c**, **d** Peripheral fundus images demonstrating the presence of creamy round multifocal choroidal lesions corresponding to choroidal granulomas.

uncontrolled HIV, yet it is also observed in other states of immunosuppression, such as organ transplantation, malignancy, diabetes, extended corticosteroid, or immunosuppressive treatment [4].

The pathogen infects the host through the respiratory pathway and can disseminate throughout the body, particularly within the central nervous system, sometimes leading to cryptococcal meningitis. HIV-infected individuals carry an 80% risk of developing meningitis in the context of cryptococcosis infection [5]. The mortality rate associated with this meningitis is estimated at approximately 15% in patients in an advanced stage of AIDS in developed countries, although this figure has significantly declined since the introduction of highly active antiretroviral therapy [5].

Most ocular involvements related to cryptococcosis occur after the development of meningitis with papillary edema being the most common sign, in about a third of cases [3]. Other's manifestations include cranial nerve palsy, endophthalmitis, and intraocular

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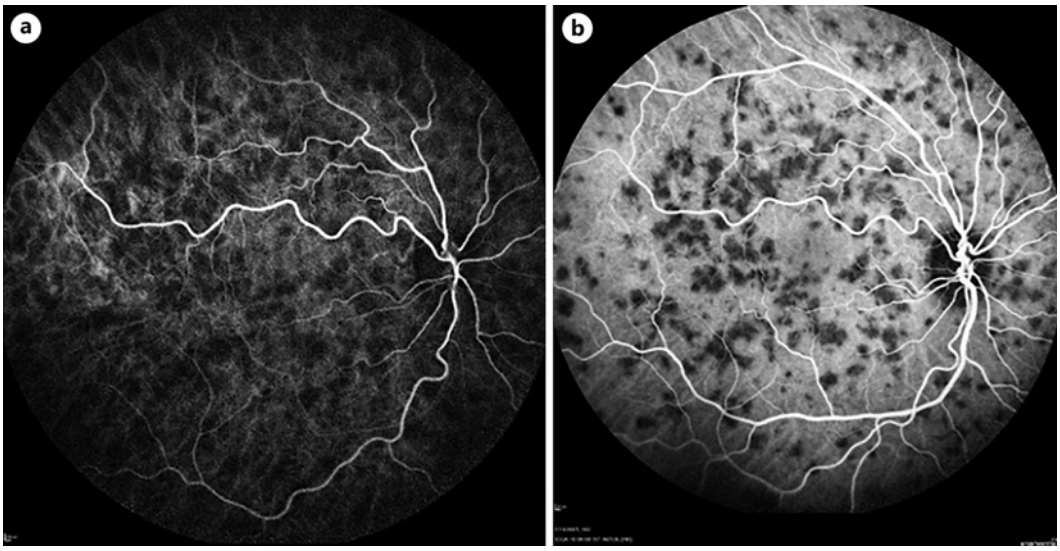

Fig. 2. Initial ICGA. **a** Presence of numerous choroidal granulomas observed as hypofluorescent spots in the early phase. **b** The hypofluorescent choroidal granulomas become more numerous in the late phases. ICGA, indocyanine green angiography.

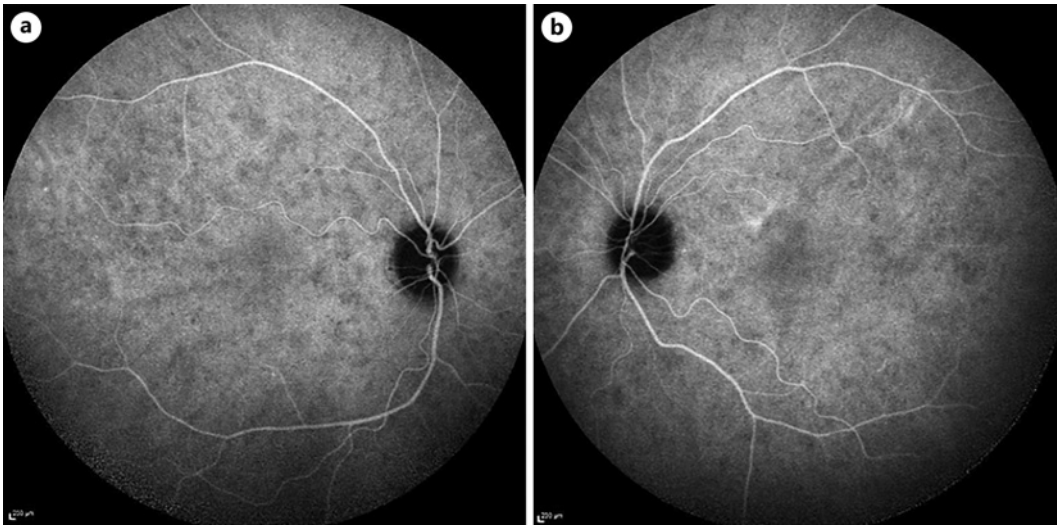

Fig. 3. ICGA images after 2 months of treatment: the choroidal granulomas in the right eye (**a**) and left eye (**b**) have substantially regressed, leaving only a few residual hypofluorescent spots. ICGA, indocyanine green angiography.

inflammation with vascular involvement and exudates. Conversely, involvement of the choroidal regions is exceptionally uncommon, representing a mere 3% of occurrences as ascertained through postmortem investigations [6]. Furthermore, it has been reported that chorioretinal involvement is linked to hematogenous dissemination of cryptococcus through the choroidal vasculature, rather than contiguous infection through the meninges, unlike most ocular presentations [7, 8].

In cases of choroiditis, choroidal granulomas can be associated with serous retinal detachment, vasculitis, and papillitis. However, these anomalies lack specificity for cryptococcosis, warranting a comprehensive differential diagnosis that includes tuberculosis, histoplasmosis, pneumocystosis, toxoplasmosis, and candidiasis [7].

Usually, patients afflicted with cryptococcal choroiditis exhibit ocular symptoms such as reduced visual acuity, scotomas, blurred vision, and diplopia. Nonetheless, documented literature has also highlighted instances where no symptoms were present [9, 10]. Additionally, cases have been described where choroidal involvement preceded meningeal affection [10, 11]. Therefore, fundus examination is essential for every HIV patient, especially when CD4 counts are below 200 cells per μL, even in the absence of ocular symptoms [12].

Following the identification of cryptococcal choroiditis during meningitis, expedient treatment is imperative. An induction phase involving intravenous administration of amphotericin B (0.7–1.0 mg/kg/day), with or without adjunct flucytosine (100 mg/kg/day), over a span of 2 weeks is recommended. After this, a consolidation phase ensues, marked by a transition to oral fluconazole at a daily dosage of 800 mg for a duration of 8 weeks [13]. Thereafter, a dose reduction to 200 mg per day is advised until HIV viral load is under control. Systemic treatment can be complemented by intravitreal injections of amphotericin B, but there are no clear guidelines, and therefore, it is conducted on an individualized basis. Vigilant monitoring of antiretroviral therapy is crucial to prevent an immune recovery reaction [8].

In conclusion, fundus examination plays a crucial role in detecting opportunistic infections among patients with HIV/AIDS. In our specific case, the patient was diagnosed with cryptococcal meningitis, and ocular involvement, particularly the choroidal lesions, was assessed through ocular examinations and tests.

Ophthalmologists must exercise heightened vigilance when conducting ocular assessments on immunosuppressed patients, considering the possibility of opportunistic infections, even in scenarios where patients might not display pronounced inflammatory responses due to their immunocompromised status. The CARE Checklist has been completed by the authors for this case report, attached as supplementary material (for all online suppl. material, see https://doi.org/10.1159/000535151).

Statement of Ethics

Ethical approval is not required for this study in accordance with local or national guidelines. Written informed consent was obtained from the patient for publication of the details of their medical case and any accompanying images.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

This work was conducted collaboratively among all authors. Sara Sanfilippo and Bastien Docquier drafted the manuscript. Paul Schrooyen created the figures. Aurelie Le and Dorine Makhoul examined and treated the patient at the hospital. Aurelie Le provided final approval for the manuscript to be published.

Data Availability Statement

All data generated or analyzed during this study are included in this article. Further inquiries can be directed to the corresponding author.

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