

## A case of endogenous candida endophthalmitis with incidental cytomegalovirus infection and optic neuropathy in a patient recovered from severe COVID-19

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A 62-year-old female diabetic recovered from COVID-19 pneumonia after receiving a prolonged course of steroids. She presented with a clinical picture of left-eye panuveitis with white cotton ball chorioretinal lesions and RAPD suggesting an optic neuropathy (VA HM). Diagnostic vitrectomy was performed to take samples for infective screen and to give intravitreal voriconazole empirically. Smear, culture, and PCR for viral DNA confirmed mixed infection of endogenous Candida endophthalmitis and incidental CMV infection. With further treatment, her corrected vision improved to 6/18 with regressing fungal lesions in serial fundus photographs. Prompt diagnosis and intervention preserved her vision and prevented potential life-threatening complications.

**Key words:** 23-G TPPV, Candida endophthalmitis, CMV infection, COVID-19 pneumonia, endogenous endophthalmitis, mixed infection endophthalmitis, optic neuropathy

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Prolonged use of high-dose steroids in the management of COVID-19 pneumonia enhances opportunistic infections in clinically susceptible immunocompromised patients.<sup>[1]</sup> Therefore, in post-COVID-19-pneumonia patients presenting with blurred vision, floaters and painful red eyes, high level of clinical suspicion of endogenous endophthalmitis would preserve vision and other life-threatening complications due to hematogenous spread of opportunistic infections. We report the approach and management of a case of Candida Endophthalmitis complicated with incidental CMV infection of vitreous fluid (mixed infection) and optic neuropathy in a patient who recovered from severe SARS COVID-19 pneumonia.

## Case Report

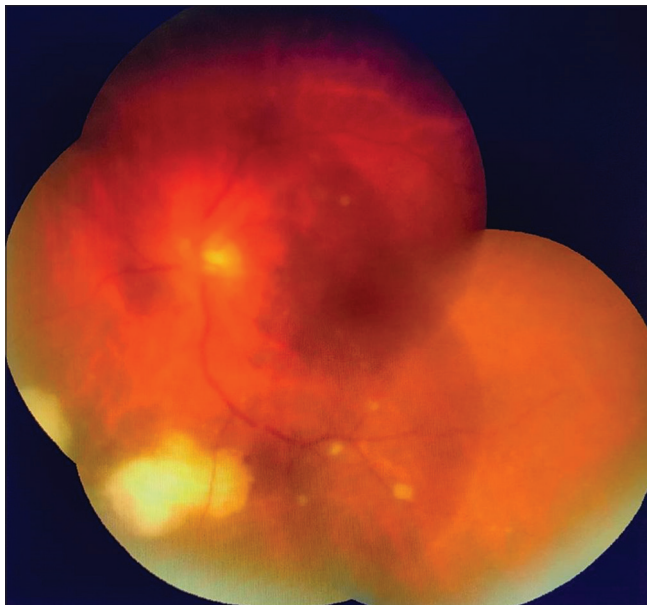
A 62-year-old female, known diabetic for 1 year, was treated for severe COVID-19 pneumonia in a COVID-19 treatment center in Sri Lanka for 2 weeks. She was treated with a prolonged course of steroids, high-flow oxygen, antibiotics, and low molecular weight heparin (enoxaparin). A week after the discharge while on home quarantine, she found her left eye vision blurry with floaters and mild redness and pain.

On examination, her vision in the right eye was 6/9 and left eye HM. There was mild conjunctival injection with anterior chamber flare but no hypopyon. She had mild relative afferent pupillary defect (RAPD) in her left eye and was then proceeded for dilated funduscopy after the gonioscopy examination confirmed the open angles. Her intraocular pressures were 12 mm Hg in each eye. Dilated funduscopy of the left eye revealed vitreous haze with vitritis and two large white chorioretinal lesions twice the size of the optic disc and a few small satellite lesions scattered in the inferior mid-peripheral fundus [Fig. 1]. Tentative diagnosis of left eye panuveitis with optic neuropathy was made and admitted for investigation and management. Initially, she was started on topical prednisolone acetate 1%

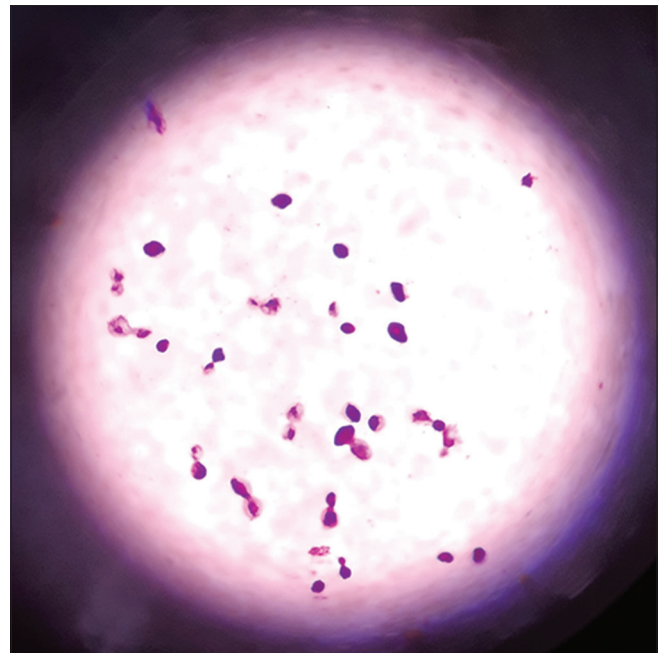
6 hourly, topical moxifloxacin 4 hourly, oral azithromycin 500 mg daily, and oral valganciclovir 900 mg bd. Differential diagnoses were viral retinitis (herpes simplex, varicella zoster, cytomegalovirus), toxoplasma retino-choroiditis, endogenous fungal endophthalmitis or post-COVID-19 unknown inflammatory panuveitis.<sup>[2]</sup>

On the following day, 23-G pars planar vitrectomy (TPPV) was performed and vitreous aspirate was taken for Gram stain and culture, Fungal culture<sup>[3]</sup> viral studies and for COVID-19 RT-PCR.<sup>[4,5]</sup> After the routine closure of 23-G TPPV, intravitreal voriconazole 100 microgram/0.1 cc was given empirically<sup>[3]</sup> and was put on topical prednisolone acetate 1% with topical moxifloxacin 6 hourly and added oral voriconazole 200 mg bd.

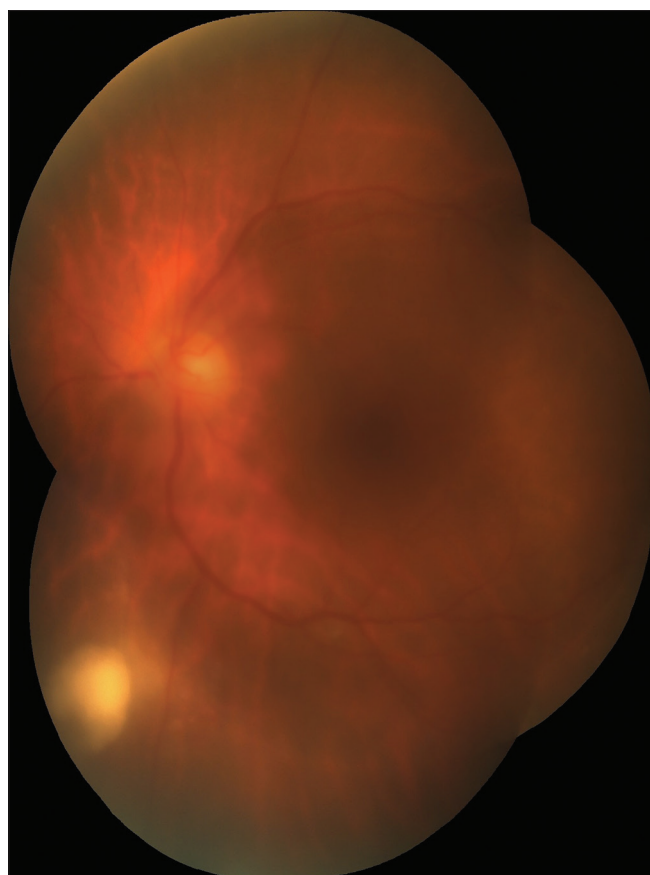
Vitreous fluid smear and culture confirmed Candida infection [Fig. 2]. Her vitreous fluid for COVID-19 RT-PCR was negative. Her blood antibody levels for COVID-19 IgG levels were >150 titer. Meanwhile, vitreous fluid taken for viral studies revealed cytomegalovirus (CMV DNA  $1.7 \times 10^2$  IU/ml) in PCR. Her blood taken for human immunodeficiency virus (HIV) and hepatitis (HepBsAg) screen were negative. Cardiology referral was done, and echocardiography was normal. MRI brain and orbit performed on the third day of admission was normal. Therefore, mixed infection with endogenous candida endophthalmitis with incidental cytomegalovirus infection of vitreous fluid (CMV) was made. She was started on Intravenous liposomal amphotericin B 3 mg/kg daily (200 mg in 500 ml normal saline infusion daily with adequate hydration before and after the infusion with normal saline) and daily renal functions (serum creatinine, serum electrolytes, e-GFR) and serum magnesium ( $Mg^{+2}$ ) levels were monitored. She received intravitreal amphotericin B 5  $\mu$ g/0.1 ml and intravitreal ganciclovir 2 mg/0.1 ml 4 days after the diagnostic 23-G TPPV. Intravenous liposomal amphotericin B was continued for 7 days, and the patient was discharged on oral



**Figure 1:** Left-eye fundus image at presentation. Note white cotton ball lesions with chorioretinitis and a few small satellite lesions in the inferior mid-peripheral retina and vitreous haze. VA: HM



**Figure 2:** Gram stain smear under the microscope showing the gram-positive budding unicellular cells. Candida spp

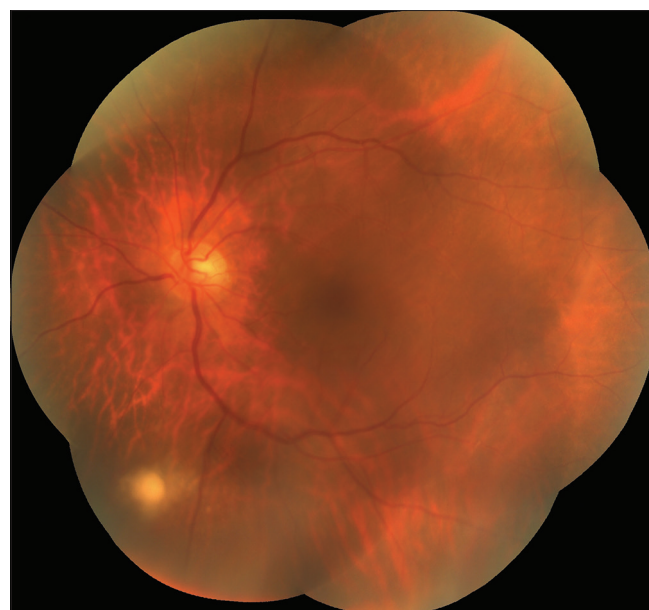


**Figure 3:** Left-eye fundus image a week after treatment showing early regressing chorioretinitis VA 6/36

voriconazole 200 mg bd, oral valganciclovir 450 mg bd, topical G. prednisolone acetate 1% tds, and moxifloxacin 6 hourly. A week after the treatment, her vision improved to 6/36 from HM with improved vitreous clarity and regression of retinal and subretinal lesions [Fig. 3]. Two weeks after discharge, her vision has further improved to 6/18 with best correction with regressing lesions [Figs. 3 and 4]. Oral Voriconazole 200mg b.d. and oral Valganciclovir 450 mg b.d were continued for one month with renal function monitoring.

## Discussion

This case with diabetes mellitus was treated with a prolonged course of steroids for severe COVID-19 pneumonia (intravenous dexamethasone 6 mg/day for 10 days followed by oral prednisolone 40 mg/day, which was tailed off over 12 days). Prolonged course of steroid treatment in an already immunocompromised state enhanced the susceptibility for opportunistic mixed fungal and viral infection, causing endogenous endophthalmitis.<sup>[2]</sup> On the other hand, this patient's poor vision (HM) despite the normal macula and some vitreous haze could be attributable to a milder form of non-arteritic type of ischemic optic neuropathy (NAAION) or CMV infection of vitreous fluid induced optic neuritis because she had RAPD initially. There are some reported cases of NAAION in post COVID-19 patients, which explains the possibility of endotheliopathy and transient hypoperfusion of peripapillary microcirculation.<sup>[6]</sup>



**Figure 4:** Left eye fundus image 3 weeks after treatment showing improved clarity and involuting chorioretinal lesions. Best-corrected VA: 6/18

Decision to go ahead with diagnostic 23-G pars planar vitrectomy after initial clinical diagnosis of presumed fungal endogenous endophthalmitis is the turning point in the management of this patient where adequate samples were obtained (vitreous fluid in aspirate while doing vitrectomy with Alcon Constellation vision system) for microbiological identification of causative organisms.<sup>[3]</sup> On the other hand, it helped for the treatment removing inflamed vitreous with fungal and viral elements and debris and to administer initial voriconazole empirically.

In this COVID-19 era, there is a tendency for one to think of this kind of a clinical scenario as a non-infectious panuveitis with immunological etiology related to COVID-19 disease and to start high-dose steroids either systemic or periocular to bring down the ocular inflammation. Treating with high-dose steroids would have complicated the situation with vision loss.<sup>[7]</sup> Therefore, holistic approach with high level of suspicion of fungal endophthalmitis preserved the vision.

To our knowledge, this is the first case of microbiologically confirmed mixed viral and fungal endophthalmitis (Candida endogenous endophthalmitis and incidental CMV infection of vitreous fluid) in a patient recovered from COVID-19 pneumonia.<sup>[8]</sup>

## Conclusion

Prolonged high-dose steroid treatment in COVID-19 pneumonia increased this patient's susceptibility to opportunistic infection with candida and CMV. Prompt diagnosis both clinically and microbiologically with early intervention saved her vision and other life-threatening complications with systemic candidiasis and Cytomegalovirus infection.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have

given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

#### Conflicts of interest

There are no conflicts of interest.

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