

## Candida Albicans Sub-Retinal Abscess following COVID-19

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A 42-year-old male post-renal transplantation presented with sudden diminution of vision in the left eye. The right eye was lost following a failed vitreoretinal surgery 5 years ago. The patient had been hospitalized 4 months prior for coronavirus disease 2019 infection with a good recovery. The presenting visual acuity was 20/600 in the right eye and 20/250 in the left eye. Fundus examination revealed a sub-macular sub-retinal abscess in the left eye. Sub-retinal aspiration of the abscess revealed *Candida albicans*. The patient was managed with repeated intravitreal amphotericin B injections, following which the abscess resolved with scarring and vision improving to 20/60.

**Key words:** Candida, COVID-19, sub-retinal abscess

A sub-retinal abscess is a rare manifestation of endogenous endophthalmitis that presents in immuno-compromised individuals.<sup>[1]</sup> Bacteria such as Klebsiella, Nocardia, Pseudomonas, and Gram-positive cocci have been more commonly reported as etiologic agents. Sub-retinal abscess secondary to fungi is rare, of which *Aspergillus* species is more often noted to be causative.<sup>[2]</sup> *Candida* is primarily reported to involve the vitreous with sub-retinal abscess being a very sparsely reported occurrence.<sup>[1,3,4]</sup> Our case details the clinical presentation, diagnostic technique, and treatment of *Candida* sub-retinal abscess in an immuno-compromised patient

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post-renal transplantation compounded by recent coronavirus disease 2019 (COVID-19) infection.

### Case Report

A 42-year-old male patient presented with complaints of sudden onset diminution of vision in the left eye (LE) of 4 days duration. He had previously undergone multiple vitreoretinal surgeries in the right eye (RE) 5 years ago for endogenous endophthalmitis, with poor visual recovery. He was a known diabetic on insulin and had undergone renal transplantation a few months prior, following which he was on immuno-suppressive therapy. Blood sugar at presentation was 220 mg%. He had a recent history of COVID-19 infection that had warranted hospitalization and treatment with corticosteroids. The time period between COVID-19 infection and the ocular symptoms was 4 months. The total duration of systemic steroid therapy received during COVID-19 treatment was 1.5 months. The visual acuity in the RE was 20/600, and that in the LE was 20/250. Anterior segment examination was unremarkable. Fundus examination of RE revealed a pale disc and ischemic retina with silicone oil in situ. LE fundus examination revealed macular hemorrhagic edema with sub-retinal exudates at the fovea [Fig. 1].

### Investigations

LE optical coherence tomography (OCT) passing through the lesion revealed sub-retinal hyper-reflective material without breach of the retinal pigment epithelium (RPE) [Fig. 2]. A differential diagnosis of *Candida* sub-retinal abscess or cytomegalovirus (CMV) retinitis was considered.

### Treatment

The patient underwent vitreous and sub-retinal biopsy with empirical intravitreal antibiotics (vancomycin, ceftazidime, amphotericin B, gancyclovir). The surgical technique involved dry vitrectomy with air injection through the infusion port. A deep vitreous biopsy was taken adjacent the lesion to ensure high yield. Biopsy from sub-retinal abscess was taken with the aid of a 41G needle, and fluid-air exchange was performed [Video 1]. Vitreous biopsy revealed no inflammatory cells or organisms. The smear from the sub-retinal biopsy material was significant for yeast on day 1 post-operatively, and culture isolated *Candida albicans* 1 week later, clinching the diagnosis of a focal sub-retinal *Candida* abscess [Fig. 3a and b]. The patient was treated with intravitreal amphotericin B (5 µg/0.1 ml). A total of three doses were given over a span of 7 days. The

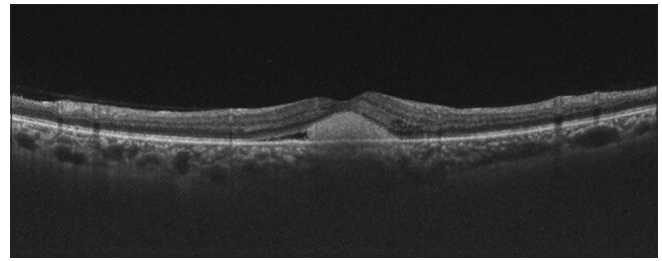
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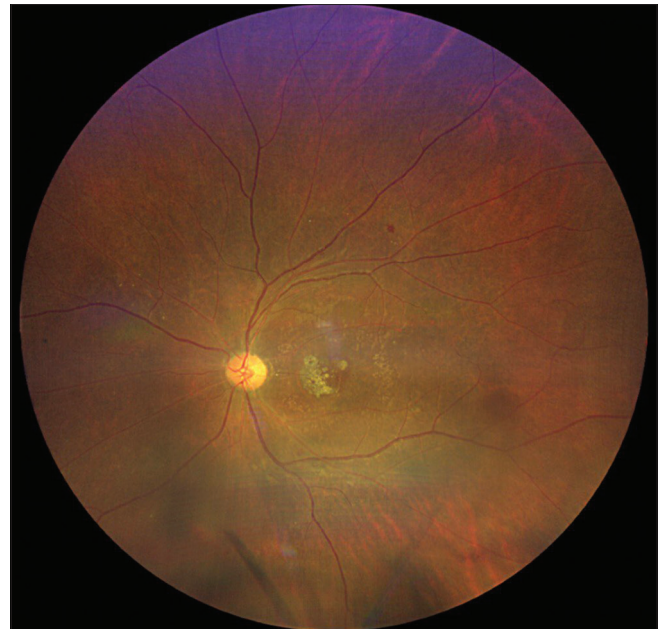
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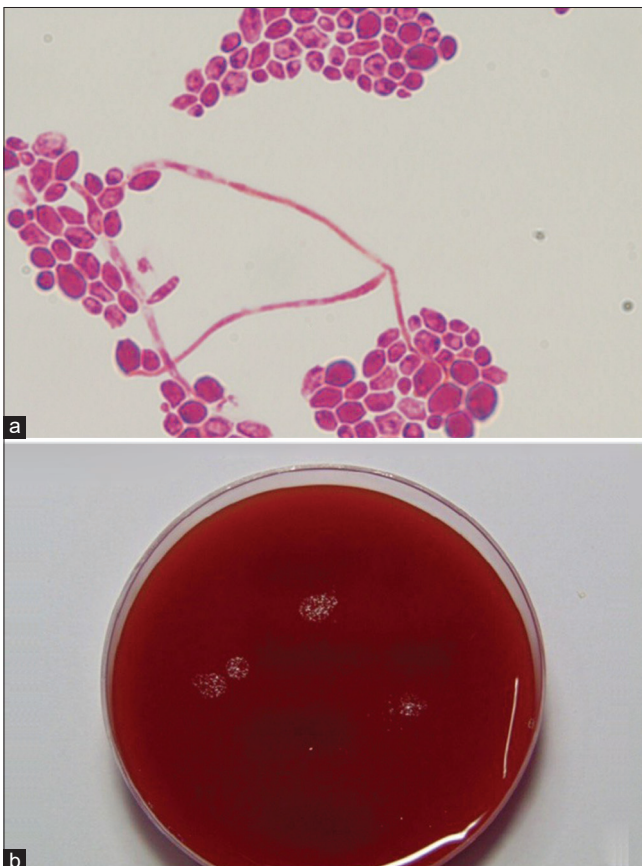
**Figure 1:** Fundus image of the LE showing macular sub-retinal abscess with edema and specks of hemorrhage



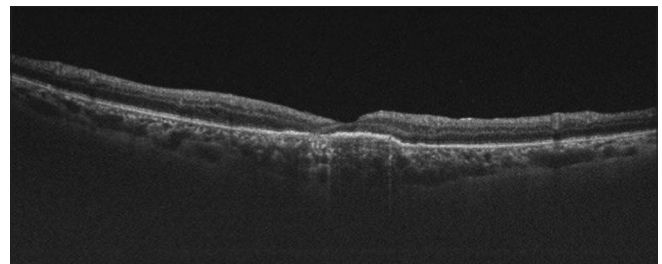
**Figure 2:** OCT image of the LE passing through the lesion showing sub-retinal hyper-reflective material without breach of RPE



**Figure 4:** Fundus image of LE showing resolved sub-retinal abscess with scarring



**Figure 3:** (a) Gram stain of *Candida albicans* from the blood agar culture at 1000x, showing yeast cells with branching pseudo-hyphae; (b) confluent dry cream-white colonies of *Candida albicans* on blood agar after cultivation for 48 hours at 37°C



**Figure 5:** OCT LE confirming resolution with sub-retinal hyper-reflective scar

sub-retinal abscess resolved with scarring, confirmed on OCT [Figs. 4 and 5].

Subsequent follow-up was uneventful with a visual acuity of 20/60 in the LE at the last visit, 3 months post intervention.

## Discussion

Sub-retinal abscess secondary to fungal etiology is rare. In contrast to our case, histopathological studies have shown

that *Aspergillus* is more often seen in sub-retinal and sub-RPE space, whereas *Candida* is more commonly concentrated in the vitreous, attributed to the high glucose concentration in the vitreous cavity.<sup>[5]</sup> Very few cases of sub-retinal abscess secondary to *Candida* have been reported in the literature. Kaburaki *et al.*<sup>[1]</sup> first reported a case of *Candida albicans* endophthalmitis with sub-retinal abscess that was confirmed on histopathology in a patient who underwent liver transplantation. Arai *et al.*<sup>[3]</sup> reported a case of bilateral *Candida* sub-retinal abscess in a patient on corticosteroids for interstitial pneumonia, elaborating on the diagnostic challenges and poor visual prognosis in this entity. Zafar *et al.*<sup>[4]</sup> reported occurrence of *Candida* endogenous endophthalmitis with sub-retinal abscess in an immuno-competent patient that was confirmed on vitreous biopsy and managed with vitrectomy and intravitreal amphotericin B. Our patient had multiple risk factors including immuno-suppression following renal transplantation, diabetes mellitus, and recent COVID-19 infection.

Shah *et al.*<sup>[6]</sup> reported a case series of presumed fungal endogenous endophthalmitis in post COVID-19 patients of which three patients presented with similar sub-retinal abscesses. Microbiological confirmation on vitreous biopsy was not obtained in these cases; however, clinical improvement following empirical anti-fungal treatment provided a therapeutic diagnosis.<sup>[6]</sup>

An earlier study at our institute found that fungal etiology was more common in post-COVID-19 endogenous endophthalmitis, with *Candida* being the most commonly implicated organism.<sup>[7]</sup> Two recent studies have reported similar cases of *Candida* retinitis and endogenous endophthalmitis following COVID-19.<sup>[8,9]</sup>

## Conclusion

Our case was unique in that sub-retinal biopsy was confirmatory, which guided early institution of amphotericin B, with effective resolution of the abscess. *Candida albicans* should be considered in the differential diagnosis of sub-retinal abscess in the immuno-compromised, particularly post-COVID-19, 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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## Conflicts of interest

There are no conflicts of interest.

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