


Sub-internal limiting membrane haemorrhage as a manifestation of transiently deranged coagulation profile following SARS-CoV-2 infection

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DESCRIPTION

We herein report a case of unilateral acute-onset transient self-resolving central visual loss following SARS-CoV-2 infection in a 41-year-old man attributed to the presence of sub-internal limiting membrane (ILM) haemorrhage. He tested positive for SARS-CoV-2 infection, confirmed with RT-PCR, was advised home isolation, and treated with antipyretics, multivitamin medications only. He developed a drop in vision in the right eye 4 weeks after testing positive for COVID-19. His presenting visual acuity was 20/60 for distance, N10 for near in right eye while left eye had normal vision (20/20, N6). Dilated fundus evaluation exhibited the presence of yellowish-white altered sub-ILM bleed at the fovea in the right eye. The left eye had the presence of cotton wool spots along the inferotemporal arcade along with segmental arteriolar attenuation (figure 1A,B). Optical coherence tomography (OCT) showed the presence of focal hyper-reflectivity in the inner retinal layers underneath ILM with back shadowing (figure 1C) features consistent with sub-ILM haemorrhage while left eye showed normal OCT scan with foveal contour well maintained (figure 1D). His fundus fluorescein angiography showed normal arm to retina and A-V transit time with mild blocked fluorescence in the right eye. While the left eye showed patchy early choroidal hypo fluorescence with late iso fluorescence indicating either choroidal hypoperfusion or ischaemia. We investigated and found that he had a normal haemogram, normal C reactive protein levels (0.6 mg/mL), normal D-dimer levels (<50 ng/mL), erythrocyte sedimentation rate of 20 mm/hour. However, he had a prolonged (>120 s) activated partial thromboplastin time (aPTT), prolonged prothrombin time (PT) of 29.0 s. He had gradual resolution of sub-ILM haemorrhage with improvement in visual acuity. His visual acuity at 3 months follow-up was 20/25 in the right eye with complete resolution of sub-ILM haemorrhage (figure 2). His aPTT (33.5 s) and PT (11.6 s) achieved normality at this visit.

Spontaneous sub-ILM haemorrhages in absence of vascular disorders have mainly been associated with Valsalva retinopathy¹ and Terson's syndrome.² Sub-ILM haemorrhages have been described in a variety of clinical settings and often lead to severe visual impairment because of their predilection for the macular region. The predilection to the macula is explained by the absence of firm attachments of the ILM to the retina at the posterior pole.³

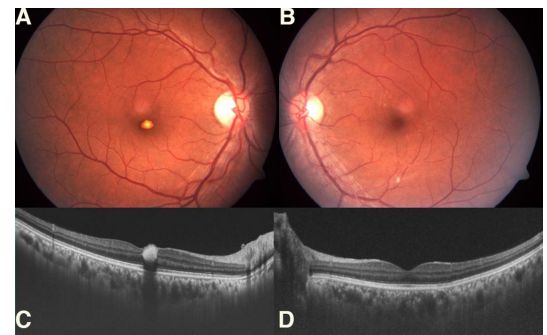


Figure 1 Fundus photography at presentation. (A) Right eye showing foveal yellowish sub-ILM haemorrhage. (B) Left eye cotton wool spot with segmental arteriolar attenuation. (C) OCT right eye confirmed sub-ILM location with focal hyper-reflectivity and back shadowing. (D) Left eye OCT was normal. ILM, internal limiting membrane; OCT, optical coherence tomography.

A deranged coagulation profile is often seen in patients with COVID-19 along with/without elevation of D-dimer levels. D-dimer, commonly elevated in patients with COVID-19, is a fibrin-degradation product that is increased in thrombotic events, indicating fibrinolysis.⁴ Raised D-dimer values, lead to activation of coagulation cascade secondary to systemic inflammatory response syndrome, correlate to the disease severity and high mortality in such patients.⁵⁻⁷ On the contrary, in our patient D-dimer levels were normal post-COVID while PT and aPTT were raised. With time, the recovery and

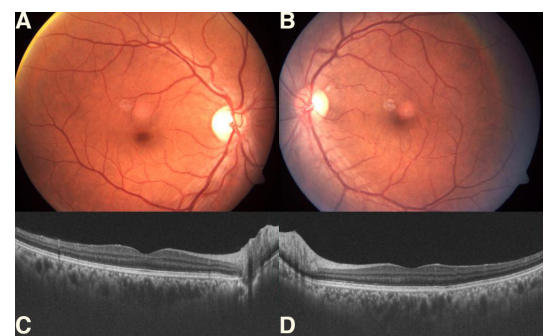


Figure 2 Fundus photography at 3 months. (A) Complete resolution of sub-ILM haemorrhage in the right eye. (B) Resolution of earlier cotton wool spot, however, a new cotton wool spot was noted temporal to the disc. (C,D) OCT macula of both eyes was largely normal. ILM, internal limiting membrane; OCT, optical coherence tomography.



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normalisation of aPTT and PT values suggest the self-resolving nature of COVID-19 systemic microangiopathy. Routine ocular fundus examination and ordering D-dimer assay and other coagulation profile tests like PT, aPTT test in patients with COVID-19 presenting with sub-ILM bleed is extremely crucial as prompt anticoagulation is mandated in some of these patients.^{8 9}

Earlier, we had hypothesised the role of retinal capillary plexus ischaemia and its possible association with elevated D-dimer levels leading to retinal ischaemic changes.¹⁰

The direct effect of viral infection, hypercoagulation and vasculopathy are proposed to be the factors leading to various retinal changes.¹¹ The reason for the development of cotton wool spots in COVID-19 cases, as also seen in the left eye of our case, has been unclear with a unique pattern of self-resolution, localised lesions and occult nature.¹² We hypothesise that COVID-19 systemic microangiopathy manifesting as transiently deranged coagulation profile could be the cause of transient vision loss with sub-ILM haemorrhage in our case. Further studies to implicate the role of deranged coagulation profile in COVID-19 cases are needed before meaningful conclusions are made.

Patient's perspective

I am thankful to my ophthalmologist for the early diagnosis of my ocular condition. He reassured and apprised me regarding the nature of the haemorrhage in my right eye. The ophthalmologist kept me under watchful observation for 3 months during which my vision improved to near normal.

Learning points

- ▶ Sub-internal limiting membrane (ILM) haemorrhages and cotton wool spots can occur following recovery after SARS-CoV-2 infection.
- ▶ COVID-19 microangiopathy leading to transiently deranged coagulation profile can be a self-limiting disease.
- ▶ Sub-ILM haemorrhage after SARS-CoV-2 infection can lead to transient visual loss with possibilities of self-resolution following recovery in a deranged coagulation profile.

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Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.

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