Bilateral paracentral acute middle maculopathy in a SARS-CoV-2-positive patient

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A 28-year-old man was admitted to hospital for surgical repair of a distal femur fracture sustained during a road traffic accident. Recovery was complicated by a pulmonary embolism. Two days later, his respiratory status declined, and he was transferred to intensive care unit (ICU) for ventilatory support due to confirmed SARS-CoV-2 infection.

He reported bilateral reduced vision after being discharged from ICU. Visual acuities were 6/18 right and 6/12 left. Dilated funduscopy revealed bilateral cotton wool spots and small, sparse mid-peripheral intraretinal haemorrhages (figure 1). Discrete areas of retinal pallor involving the fovea were consistent with paracentral acute middle maculopathy (PAMM), confirmed on optical coherence tomography (OCT) (figure 2).

Vision improved spontaneously to 6/7.5 in each eye at 3 months, although a subjective central visual scotoma remained. Repeat OCT revealed characteristic thinning of the inner nuclear layer (INL) of the retina.

PAMM refers to the OCT finding of hyper-reflective band-like lesions at the level of the INL.1 It may occur in isolation or secondary to a disorder associated with retinal ischaemia, primarily at the level of the intermediate and deep plexuses.2

SARS-CoV-2 is associated with a significant risk of systemic thrombotic complications,3 which have been attributed to complement-mediated thrombotic microangiopathy.4 Capillary microvascular events are likely to have contributed to the retinal findings seen here. Microhaemorrhages, flame-shaped haemorrhages and cotton wool spots have more commonly been described in patients with SARS-CoV-2.5 There have also been reports of PAMM following SARS-CoV-2.6–8 To our knowledge, this is the first reported case of PAMM in a SARS-CoV-2-positive patient with a pulmonary embolism. This supports the proposed thrombotic mechanism for PAMM associated with SARS-CoV-2 infection.

Purtscher retinopathy is another potential differential in this case. It is difficult to determine which was the predominant contributing factor to the findings seen. The pattern and distribution of retinal changes could be attributable to either. However, the pathognomonic Purtscher flecken (polygonal areas of retinal whitening occurring in the inner retina, between retinal arterioles and venules, seen in Purtscher retinopathy) were not seen in this case. The timing of onset of symptoms 1–2 weeks after presentation would also support the hypothesis of a SARS-CoV-2 association. Proving causality and elucidating the precise mechanisms require further research.

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Figure 1 Fundus autofluorescence of the right eye (A) and left eye (B) showing bilateral cotton wool spots (arrows) and hypofluorescence of dark grey parafoveal lesion in the right eye.

Figure 2 Optical coherence tomography scan of the right eye (A) and left eye (B) showing hyper-reflective band-like lesions at the level of the inner nuclear layer of the retina (see arrows), which are characteristic of paracentral acute middle maculopathy.
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