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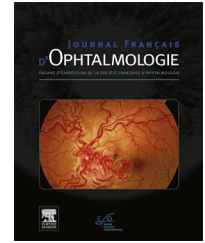


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LETTER TO THE EDITOR

Bilateral cystoid maculopathy as first manifestation of SARS-CoV-2 infection



Maculopathie cystoïde bilatérale comme première manifestation de l'infection par le SRAS-CoV-2

Covid-19 infection has been mostly associated to anterior segment diseases of the eye such as conjunctivitis, hyperemia and episcleritis. We are reporting a retinal involvement of a patient infected by SARS-CoV-2.

A 26-year-old African female was referred to our department for a bilateral cystoid maculopathy (CM). Her past medical history was unremarkable. She denied any drug or medication uptake. The patient complained of blurry vision for the past 7 days, followed by fatigue, anosmia, ageusia, fever (39 °C), cough and shortness of breath a few days after the onset of ocular symptoms. Visual acuity was 20/20 in both eyes. Anterior segments, funduscopy and intraocular pressure were normal in both eyes. (Fig. 1A–B). Optical Coherence Tomography (OCT) showed a bilateral CM associated with a serous foveal detachment (Fig. 1E–F). Intraretinal cysts were located in the inner nuclear layer, inner plexiform layer and outer nuclear layer in both eyes (Fig. 1E–F). Fundus auto-fluorescence was unremarkable. Fluorescein angiography (FA) did not disclose any macular, vascular or optic nerve leakage (Fig. 1C–D). A thorough work-up including laboratory exams (CBC, kidney and liver functions, calcium, phosphor, angiotensin converting enzyme, HIV, HBV, HCV, TPHA-VDRL serologies, Quantiferon-TB-Gold, TB skin test) and a brain MRI came back negative. A chest CT scan revealed the presence of diffuse bilateral ground-glass opacities suggestive of SARS-CoV-2 infection (Fig. 1G–H). The patient refused hospitalization and PCR analysis to confirm the diagnosis of COVID-19. She was discharged against medical advice. Two weeks later, she came back symptom free for her follow-up visit. Her vision was 20/20 in both eyes and both funduscopy (Fig. 2A–B) and OCT (Fig. 2C–D) showed a complete restoration of the macular anatomy.

Discussion

This is the first case of bilateral cystoid maculopathy in the context of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection. OCT findings disclosed the presence of intraretinal and subretinal fluid without leakage on FA, suggestive of an intact blood retinal barrier (BRB) [1]. Cystoid maculopathy with foveal detachment and no fluorescein leakage can be seen in circumstances such as autosomal recessive bestrophinopathy, or MEK inhibitor toxicity which was not this patient's case.

In the absence of a BRB breakdown, retinal pigment epithelium (RPE) or Müller cell dysfunction can explain the occurrence of CM [1]. In the present case, the transient nature of ocular and pulmonary symptoms guides towards their viral nature. The SARS-CoV-2 virus might infect transiently RPE and Müller cells, thereby causing the accumulation of intra and subretinal fluid. In fact, the murine coronavirus, mouse hepatitis virus (MHV), JHM strain, was shown to infect transiently a mixed retinal (Müller)-RPE cell culture, without cytopathic effect or cell death, corroborating this hypothesis.

Direct ocular contamination is another possible route for virus penetration but it unlikely due the low expression of angiotensin converting enzyme 2 and transmembrane serine protease 2 receptor in the eye. The anterior chamber had no cells, but flare meter might be able to detect infra clinical inflammation [2–4]. Despite the absence of PCR confirmation, the diagnosis of COVID-19 is highly plausible, in the presence of suggestive systemic symptoms along with quasi pathognomonic CT scan findings [5,6]. In fact, PCR analysis was shown to yield a high rate of false negatives, and it was recently suggested that the sensitivity of chest CT scan might be higher than PCR for the diagnosis of SARS-CoV-2 infection [6]. To date, other known ophthalmological manifestation of COVID-19 are conjunctivitis, optic neuritis, choroiditis and retinal vascular involvement [7] Other recent reports showed that SARS-CoV-2 can cause neurological symptoms [8].

Optic neuritis and retinal involvement might occur in relation with optical visual pathways sars-cov-2 infection [9].

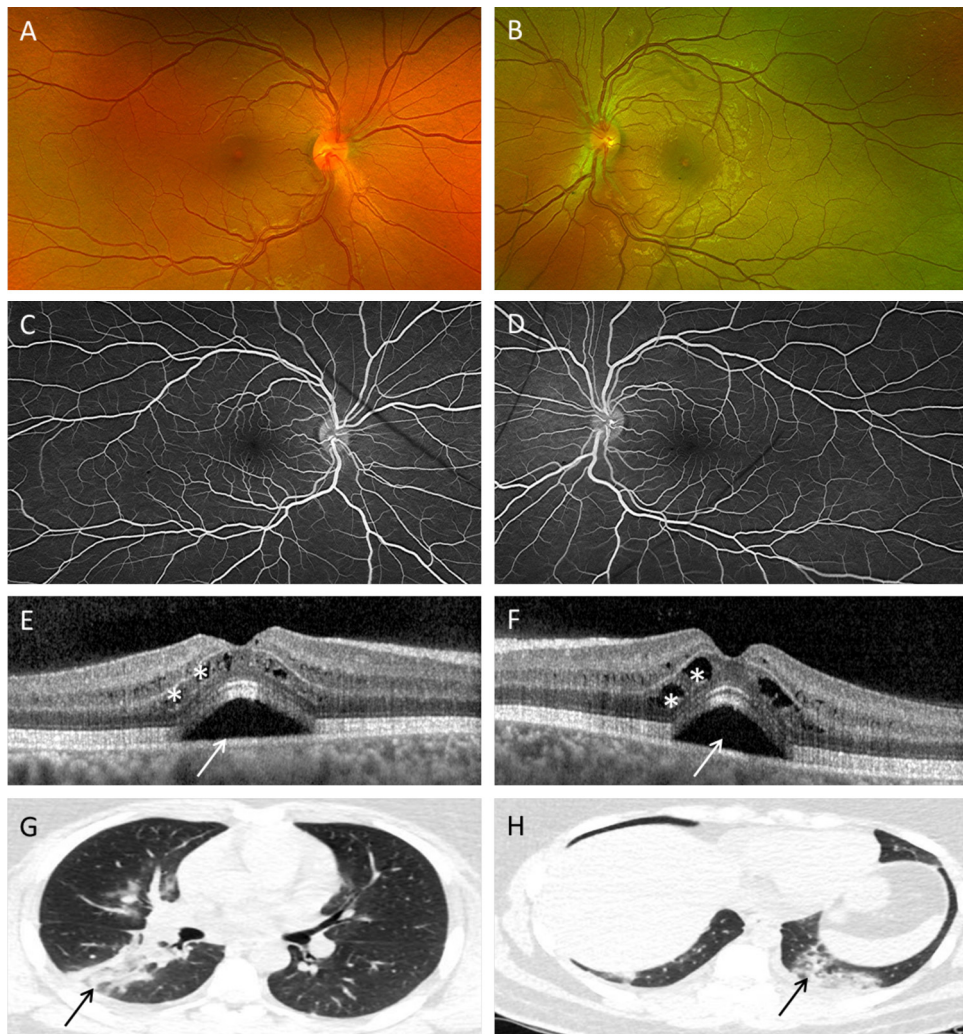


Figure 1. Bilateral SARS-CoV-2 cystoid maculopathy. A–B: Ultra wide-field color fundus photographs showing the absence of vitritis or papillitis and the presence of bilateral serous foveal detachments. C–D: Ultra wide-field fluorescein angiogram (late phase) showing absence of dye leakage at the level of the macula or optic nerve head. E–F: Optical coherence tomography showing a central foveal thickness (CFT) of 526 microns in the right eye (OD) (E) and 516 microns in the left eye (OS) (F). Bilateral serous detachment is present bilaterally (white arrows) and intraretinal cysts are observed in the inner nuclear layer, inner plexiform layer and outer nuclear layer (asterisks). G–H: Chest CT scans showing diffuse bilateral ground-glass opacities suggestive of SARS-CoV-2 infection (black arrows).

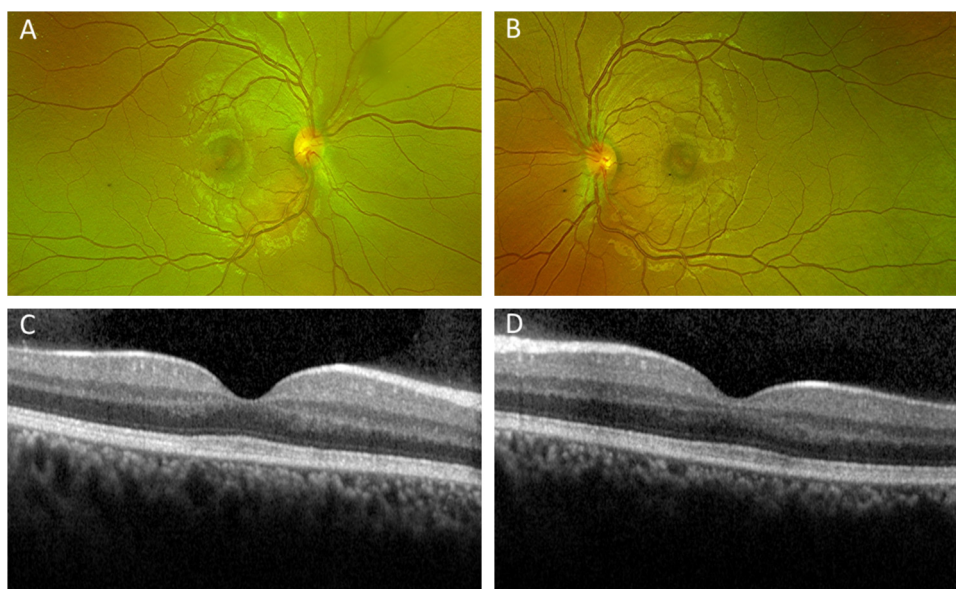


Figure 2. Spontaneous recovery of cystoid maculopathy. A–B: Ultra wide-field color fundus photographs showing an improvement of the foveal reflex. C–D: Optical coherence tomography showing full recovery of the maculopathy and a normal foveal anatomy with a CFT of 285 microns OD and 270 microns OS.

In the light of the current knowledge and present observation, we believe that COVID-19 is capable of invading the retina and causing a transient cystoid maculopathy. OCT examination is therefore recommended when examining COVID-19 patients, as our patient was mostly asymptomatic.

Acknowledgements

None.

Disclosure of interest

The authors declare that they have no competing interest.

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