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Case Report

Focal Cerebral Arteriopathy in a Young Adult Following SARS-CoV2 Reinfection

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Ten days after SARS-Cov2 reinfection with mild gastrointestinal symptoms and headache that occurred 2 months after an initial infection, a previously healthy 37-year-old woman developed fluctuating facial and upper limb paresthesia and weakness. Diffusion-weighted magnetic resonance imaging revealed ischemic lesions in the right parietal region of different stages within the same vascular territory. A cerebral angiography demonstrated an isolated focal arteriopathy with no other arterial involvement. Focal cerebral arteriopathy is exceedingly rare among adults and most commonly triggered by varicella-zoster virus reactivation. We present a case of focal cerebral arteriopathy in a patient with a recent reinfection with SARS-CoV-2.

In December 2020, a 37-year-old woman developed fever, headache, abdominal pain, nausea and diarrhea, without any respiratory symptoms. A nasopharyngeal RT-PCR swab confirmed SARS-CoV2 infection. Her symptoms resolved completely within two weeks and two subsequent swabs were negative. After being completely asymptomatic for 8 weeks, she developed again gastrointestinal disturbances and headache. A SARS-CoV2 RT-PCR swab was positive, consistent with a possible reinfection. Ten days after, the patient complained of left facial and upper limb paresthesia whose intensity fluctuated over 48 hours and that progressed eventually to left arm weakness. She did not report any headache. Her past medical history was negative for hypertension, diabetes, hyperlipidemia, systemic disease, cardiac diseases, clotting disorders, miscarriages, smoking or other medical conditions. Her arterial blood pressure was normal. On admission, her neurological examination revealed mild facial and left hand weakness without upper limb drift and decreased sensation to light touch and pinprick. Her deep tendon reflexes were increased in the left side. The National Institute of Health Stroke Scale (NIHSS) was 2 and the modified Rankin score (mRS) was 0.

Initial non-contrast brain Computed Tomography (CT) (Fig. 1A) showed an area of hypodensity in the right parietal region, consistent with ischemia. This was confirmed with a subsequent brain MRI that showed several strokes at different stages with similar deficit on Diffusion-Weighted Imaging (DWI), Fluid-Attenuated Inversion Recovery (FLAIR) and Apparent Diffusion Coefficient (ADC) sequences (Fig. 1B–D) and contrast enhancing lesions in corresponding areas (Fig. 1E). MR angiography demonstrated a narrowing of the supraclinoid tract of the right carotid artery after the origin of the ophthalmic artery. There was no wall vessel enhancement. A transcranial doppler showed high flow velocity of the right carotid artery at the syphon through orbital and temporal windows when compared to the left side, with no reversal blood flow of the right ophthalmic artery. Cerebral angiography confirmed the isolated focal arteriopathy without any other arterial involvement (Fig. 1E). There was no evidence of intracranial and extracranial atherosclerosis.

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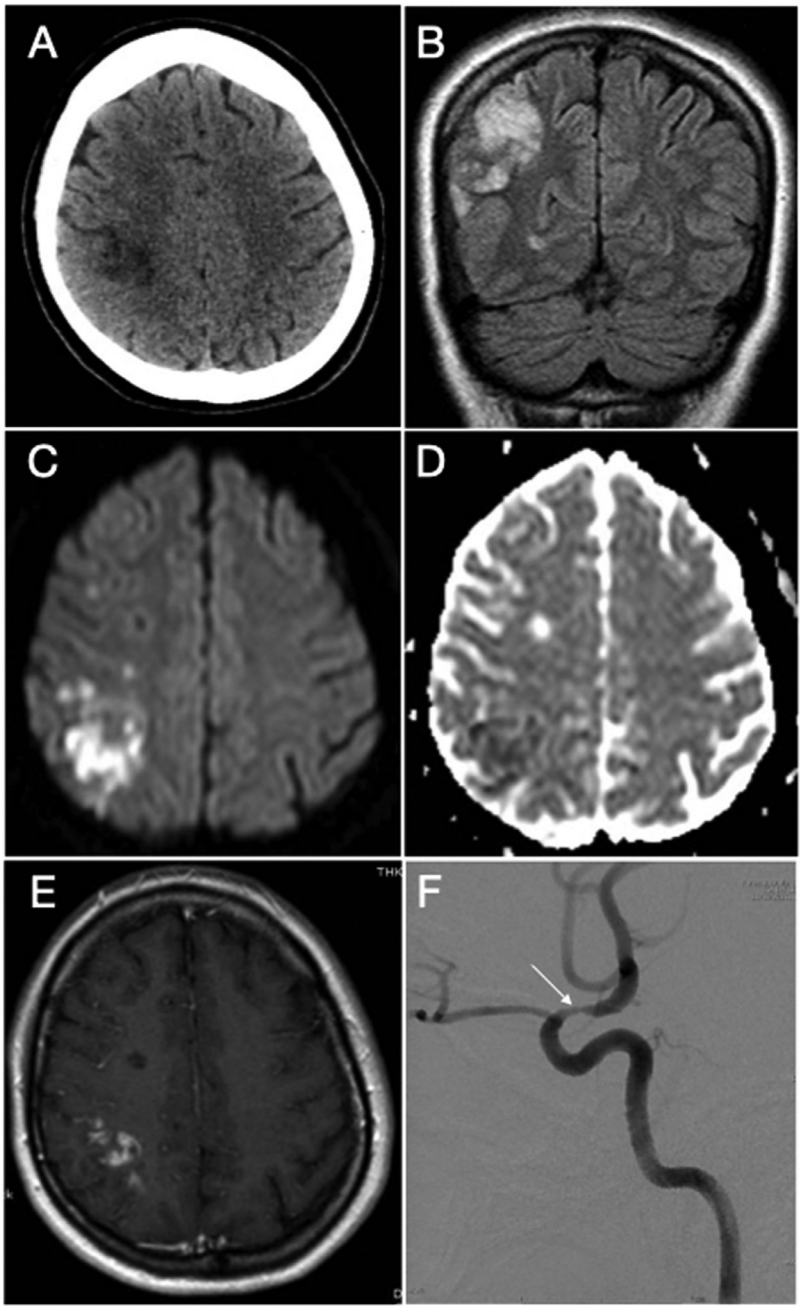

Fig. 1. *Brain computed tomography (1A) showed a recent right-sided parietal ischemia. MRI revealed ischemic lesions within the same vascular territory at different stages on FLAIR (1B) and DWI (1C) sequences. Cerebral angiography (1D) confirmed the isolated focal arteriopathy and ruled out any other arterial involvement.*

On admission, SARS-CoV2 RT-PCR swab was negative, while IgM and IgG antibodies were detected (2,890 ICO). Anti-cardiolipin (IgM and IgG) and anti-nuclear antibodies, lupus anticoagulant, extractable nuclear antigen, protein S and C, anti-thrombin III, vitamin B12, folate, homocysteine, D-dimer, LDL, and HbA1c were negative. Serum antibody assay ruled out other acute viral infections including varicella-zoster virus (VZV), herpes viruses, cytomegalovirus, Epstein-Bar virus, human immunodeficiency virus, and enteroviruses. Chest X-ray, electrocardiogram, echocardiogram and cardiac evaluation were negative. Dual antiplatelet treatment was given for three weeks, then continued with single antiplatelet therapy.

The severity of the sensorimotor hemiparesis fluctuated over the following week, during which the patient reported partial improvements and worsening of left-sided distal upper limb weakness and paresthesia, while the NIHSS ranged between 1 and 2. She achieved a complete recovery 10 days after the onset of symptoms. At the

last follow-up visit (two months after reinfection), the neurological examination was normal with no disease progression evidenced on MRI and MR angiography.

Focal intracranial arteriopathy (FCA) is responsible of up to 12% of stroke in children[1] but it is very rare among adults.[2] It commonly involves the distal internal carotid artery or the proximal segment of the middle cerebral artery and is considered a post-infectious inflammatory event. FCA is a monophasic, non-progressive disorder with unchanged or improved findings at long-term follow-up, and good outcomes in the majority of patients.[3] In the early phase, the fluctuating clinical picture, which is typical of FCA, is possibly explained by the inflammatory nature of the arterial occlusion, leading to unstable arterial blood flow and DWI-proven ischemic cerebral damages of different ages.

VZV, whose genome has been detected in more than 25% of FCA patients,[1,4] is among one of the most common triggers through a mechanism based on its reactivation in trigeminal ganglia and trans-axonal spread to the adventitia of the cerebral arteries leading to inflammatory stenosis.[1] Antiplatelet treatment is indicated and typically started in the acute phase.[5] The association with antiviral or steroids, which has been reported possibly to improve the outcome in some pediatric and young adult patients, is debated because no data from randomized trials is available.[2] For this reason and for the rapid and stable clinical improvement, we did not start steroid treatment.

FCA was diagnosed in two SARS-Cov2 positive children presenting with ischemic stroke.[6,7] Other cases of diffuse cerebral arteritis after SARS-Cov2 infection have been recently described.[8] Our case indicate that SARS-Cov2 can cause FCA also in adult patients. Its onset after SARS-Cov2 reinfection suggest that the virus might have played a role in the pathogenesis of these vascular changes. Prognosis was favorable as expected in most of the cases.[2] FCA should be considered among the causes of SARS-Cov2 related ischemic stroke in adults presenting with progressive sensorimotor impairment, and angiographic assessment should be early performed to confirm the diagnosis and provide adequate treatments.

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