



Case Report

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Posterior Reversible Leukoencephalopathy Syndrome Associated with SARS-CoV-2 Antibodies

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Keywords

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Ischemic stroke and encephalitis have been reported in patients infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [1-3]. We report case of posterior reversible encephalopathy syndrome (PRES) in a patient with SARS-CoV-2 IgG antibodies.

A 60-year-old caucasian woman was transferred from an outside hospital with one week history of severe headache, intermittent nausea, vomiting, and a one day history of episodes of dizziness, ataxia, and falls. An initial non-contrast computed tomographic of head demonstrated diffuse cerebral edema prompting transfer to our institution for further evaluation and management. The patient did not recall any contact with known SARS-CoV-2 infected patient or any history of fever, respiratory symptoms or diarrhea. On initial evaluation, her blood pressure was 150/89 mmHg. The patient was alert and oriented, and exhibited slight dysmetria of the right upper extremity. Several abnormalities were noted on testing: Elevated leukocytes, fibrinogen, D-Dimer, creatinine phosphokinase, creatinine phosphokinase MB fraction, lactate dehydrogenase, aspartate aminotransferase, alanine aminotransferase, alkaline phosphatase, N-terminal pro-b-type natriuretic peptide, and C-reactive protein. Both absolute lymphocytes and eosinophils counts were low. A nasopharyngeal swab did not identify SARS-CoV-2 antigen by PCR testing. Cerebrospinal fluid (CSF) analysis demonstrated normal protein and glucose without the presence of leukocytes or erythrocytes. Serum specimen on day 2 of admission demonstrated presence of SARS-CoV-2 IgG antibodies, with elevated IgG index 1.66. Serum specimen also demonstrated presence of fluorescent anti-nuclear antibody (speckled with titer 1:1280), antineutrophil cytoplasmic antibodies (titer 1:160), and anti-myeloperoxidase (24.9 RLU).

The CT angiogram head demonstrated vessel “pruning” in the right parieto-occipital lobes (Figure 1A). Initial MRI demon-

strated multifocal T2-weighted and FLAIR hyperintense lesions predominantly involving bilateral parieto-occipital lobes with effacement of the sulci in these regions (Figure 1B, Figure 1C and Figure 1D). There were also multifocal small T2/FLAIR hyperintensities in bilateral centrum semiovale, left corona radiata, bilateral thalami, pons, and posteroinferior cerebellum bilaterally, with effacement of the cerebellar foliae (not pictured). On day 3, the patient underwent interrogation of the right occipital and left parietal lobes with magnetic resonance spectrometry. The right occipital region revealed the presence of lactate along with attenuation of N-acetylaspartate, choline and creatine (Figure 1E) in comparison to normal tissue in the left frontal region (Figure 1G), suggestive of infarction. MRS in the left parietal lobe abnormal white matter revealed attenuation of N-acetylaspartate (Figure 1F) in comparison to normal tissue in the left frontal region (Figure 1G), suggestive of PRES.

The patient was discharged on prescriptions of aspirin 81 mg and atorvastatin 40 mg. She required minimal assistance with ambulation at discharge, with modified Rankin scale of 3. At one-month follow up, the patient reported marked recovery with intermittent positional vertigo, and short-term

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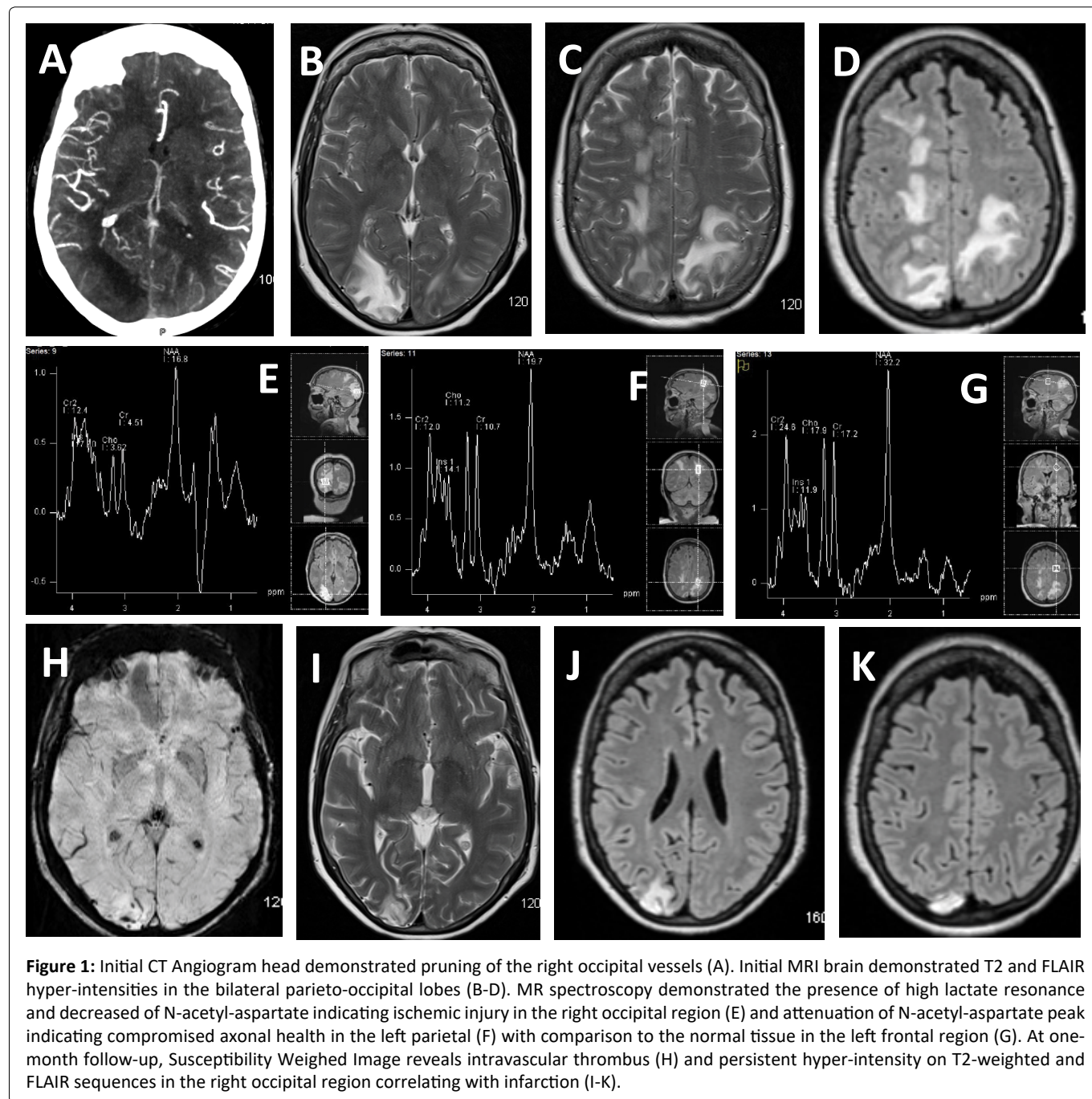


Figure 1: Initial CT Angiogram head demonstrated pruning of the right occipital vessels (A). Initial MRI brain demonstrated T2 and FLAIR hyper-intensities in the bilateral parieto-occipital lobes (B-D). MR spectroscopy demonstrated the presence of high lactate resonance and decreased of N-acetyl-aspartate indicating ischemic injury in the right occipital region (E) and attenuation of N-acetyl-aspartate peak indicating compromised axonal health in the left parietal (F) with comparison to the normal tissue in the left frontal region (G). At one-month follow-up, Susceptibility Weighted Image reveals intravascular thrombus (H) and persistent hyper-intensity on T2-weighted and FLAIR sequences in the right occipital region correlating with infarction (I-K).

memory deficits, the latter of which was longstanding. She reported no recollection of the first two days of admission, but was now back to living interdependently. Her blood pressure was 130/78 mmHg. She had no neurological deficits on exam, and a Montreal Cognitive Assessment a score of 26/30. Her disability was graded as modified Rankin of 1. The abnormalities previously noted on laboratory testing had completely resolved or improved. Serum specimen did not demonstrate presence of SARS-CoV-2 IgG antibodies. Serum specimen demonstrated presence of fluorescent anti-nuclear antibody (speckled with titer 1:1280), antineutrophil cytoplasmic antibodies (titer 1:320), and anti-myeloperoxidase (27.2 RLU). The Susceptibility Weight Image demonstrated intravascular thrombus, persistent hyperdense signal in the right occipital region consisted with infarction (Figure 1H) and interval res-

olution of previously noted T2 and FLAIR hyperintense signal in the right semiovale and left parietal region consistent with PRES (Figure 1I, Figure 1G and Figure 1K). Abnormal signal in the right cerebellum was completely resolved (not pictured).

The diagnosis of PRES was based on resolution of clinical improvement, MRI changes, MR spectroscopy findings, and absence of inflammatory changes in the CSF. PRES has been previously reported in patients with infection, sepsis or shock [4]. T-cell, endothelial cell activation and inflammatory cytokine production including TNF- α , IL-1, IFN- γ and IL-6 have been implicated in PRES in the settings of infection and sepsis [5]. A similar overproduction of immune cells and their signaling molecules have been identified in patients infected with SARS-CoV-2 [6]. A previous report found elevated IL-6, IL-8 and TNF- α in four children with SARS-CoV-2 IgG antibodies

without SARS-CoV-2 antigen detection who presented with Kawasaki Disease and Toxic Shock Syndrome [7]. Humanized monoclonal antibody (mAb) Tocilizumab, targeting IL-6 has been successful in stabilizing the alveolar capillary membrane, reducing alveolar wall edema, and preventing/reversing acute respiratory distress syndrome in some patients [8] and may be useful in patients with PRES associated with SARS-CoV-2 infection.

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