Teaching NeuroImages: SARS-CoV-2–Related Encephalitis

MRI Pattern of Olfactory Tract Involvement

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Figure Neuroimaging of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2)–Related Encephalitis

Fluid-attenuated inversion recovery sequences (A, B) demonstrated bilateral cortical hyperintensity involving predominantly the rectus gyrus (1) overlying the olfactory tract and olfactory bulb, the anterior cingulate gyrus (2), polar part of the first frontal gyrus (3), and slight involvement of the piriform cortex (4), amygdala (5), and anterior hippocampus (6). No contrast enhancement was observed on postgadolinium T1 sequences (C). Restricted diffusion was noted in the frontal gyrus (D: diffusion-weighted imaging; E: apparent diffusion coefficient). Chest CT showed areas of ground-glass opacity in both lungs, predominantly in the middle lobe (F).

A 96-year-old woman was admitted to the emergency department with generalized epileptic seizures and fever followed by left hemiparesis. Two days before admission, she had developed anosmia, dysgeusia,¹ and behavioral dysexecutive syndrome. No respiratory symptoms were present or reported. Whereas nasopharyngeal severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) reverse transcription PCR was negative, chest CT scan showed several lung

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areas of ground-glass opacity and intralobular cross-links, suggestive of SARS-CoV-2 infection.² CSF analysis yielded 8 leukocytes/mm³ (75% polymorphonuclear neutrophilic cells) and was negative for SARS-CoV-2 PCR. Brain MRI revealed hyperintensity of the olfactory tracts on T2 fluid-attenuated inversion recovery and diffusion-weighted imaging (figure). Ten days after the admission, SARS-CoV-2 serology returned positive, thus supporting a SARS-CoV-2–related encephalitis.

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Appendix Authors

Name	Location	Contribution
Olivier Casez, MD	Centre Hospitalier Universitaire de Grenoble Alpes, France	Managed the patient, wrote the manuscript, coordinated the interpretation of the MRI and biological data
Gauthier Willaume	Centre Hospitalier Universitaire de Grenoble Alpes, France	Managed the patient, wrote the manuscript, revised the manuscript for intellectual concept

Appendix (continued)

Name	Location	Contribution
Sylvie Grand, MD	Centre Hospitalier Universitaire de Grenoble Alpes, France	Acquisition and interpretation of MRI data, revised the manuscript for intellectual content
Benjamin Nemoz, MD	Centre Hospitalier Universitaire de Grenoble Alpes, Université Grenoble Alpes, France	Acquisition and interpretation of virologic data, revised the manuscript for intellectual content
Julien Lupo, MD, PhD	Centre Hospitalier Universitaire de Grenoble Alpes, Université Grenoble Alpes, France	Acquisition and interpretation of virologic data, revised the manuscript for intellectual content
Philippe Kahane, MD, PhD	Centre Hospitalier Universitaire de Grenoble Alpes, Université Grenoble Alpes, France	Managed the patient, interpreted the data, revised the manuscript for intellectual concept
Jean-Paul Brion, MD	Grenoble University Hospital, France	Oversaw the patient's management and revised the manuscript for intellectual concept

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