



# Reply to the Letter to the Editor Titled “Neuroimaging Abnormalities in SARS-CoV-2 Infected are More Diverse than Previously Thought and Depend on the Methods Used”

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The neuroimaging abnormalities in severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection are indeed more diverse than previously thought. We would like to take this opportunity to clear up a few concerns raised in the letter to the editor.<sup>1</sup>

The inclusion criteria for patient inclusion in the retrospective analysis are positive reverse transcription polymerase chain reaction (RT-PCR) and/or COVID-19 Reporting and Data System category 5 (CORADS-5) on high-resolution computed tomography (HRCT) of the thorax. It is to be emphasized here that only CORADS-5 category patients were included in the study. CORADS-5 is reported to have a specificity of 93 to 94.9% for diagnosis of COVID-19 infection.<sup>2,3</sup> Further, RT-PCR for Severe Acute Respiratory Syndrome Coronavirus 2 is reported to have sensitivity peak at 4 to 5 days after infection at 92.7% (91.4–94.0%) and remains over 88% between 5 and 14 days after infection.<sup>4</sup> Hence, the presence of either CORADS-5 on HRCT or RT-PCR positivity or both was used for the diagnosis of COVID-19. It should be emphasized that the classification of CORADS was done on HRCT only. Chest radiographs were not considered in the diagnosis of any patient.

The critique about the inclusion of a larger number of computed tomography (CT) scans of the head compared with just 28 individuals with magnetic resonance imaging (MRI) of the brain scans is indeed true. The study retrospectively analyzed patients during the first and second wave of the COVID-19 infection in India till May 2022. Head CT was the mainstay of investigation as per the institutional protocol, considering the strict isolation protocol and the need to

sanitize the scanner after scans. Our institute had two CT scanners, out of which one scanner ran round the clock to accommodate patients with COVID-19 infection. MRI was reserved for patients with diagnostic dilemmas and those who were stable enough to tolerate the MRI scan. A prospective study would have been ideal but was not possible in this pandemic scenario. There is no doubt that if MRI had been done for all patients, the results would have been different; however, it was not practically possible during the peak of the second wave, where we had the maximum number of patients.

At the time of final data evaluation, mortality was reported in 61 of 180 patients included in the study (38.3%). The association of comorbidities was not analyzed in this study.

The fourth criticism is about no explanation for neurological symptoms for 66 patients in whom CT/MRI scans were reported as normal. Most of these patients were in critical care units with presentations of altered sensorium and focal neurological deficits. Patients with negative imaging underwent extensive septic and metabolic evaluation; however, this information was not included in evaluation in this study.

The study included neuroimaging in patients admitted with COVID-19 infection during *the acute phase of disease*, and this explains the low number of patients with post-infectious demyelinating syndromes. The study did not include patients with demyelinating syndromes presenting in subacute/late phase of the disease who were COVID-19 RT-PCR negative or CORADS-5 negative because it was difficult to ascertain whether the demyelinating syndrome

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was sporadic, or vaccine associated or associated with COVID-19 infection.

The COVID-19 outbreak was declared a global pandemic on March 11, 2020, and our institution started admitting COVID-19 patients from the last week of March 2020. Neuroimaging for a COVID-19 patient was done at our institution for the first time in May 2020. Hence, an analysis of the results mentions the duration as May 2020 to May 2021.

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**Conflict of Interest**

None declared.

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