Encephalopathy in severe SARS-CoV2 infection: Inflammatory or infectious?

**Abstract**

Concerning the letter by Moriguchi et al., we describe our experience with a case of encephalopathy with and atypical damage on magnetic resonance imaging (MRI) in a patient with severe infection due to the SARS-CoV2 virus. A 56-year-old woman, without previous pathologies, developed cough, fever, and respiratory failure for five days, after returning from a 6-day trip to Venice. Chest radiography shows a large bilateral interstitial infiltrate. In the first 24 hours, she was admitted to the Intensive Care Unit (ICU) for severe respiratory failure and positive protein chain reaction-PCR in nasal exudate. She required intubation for ten days, and received ceftriaxone, ritonavir/lopinavir, corticosteroids, and hydroxychloroquine, with clinical improvement. In the first 48 hours outside the ICU, she developed an acute confusional syndrome (hyperactive delirium). On neurological examination, she exhibited temporal-spatial disorientation, incoherent fluent speech, without other neurological symptoms.

An electroencephalogram (EEG) was performed in the first 48 hours, showing generalized hypovoltaic activity. Cranial magnetic resonance imaging showed a bilateral and symmetrical increase in the supratentorial white matter's signal intensity, with a discrete thickening of both temporal lobes, with a slight increase in signal intensity and a sequence of normal diffusion. The lumbar puncture showed no changes (glucose 71 mg/dl, protein 30 mg/dl, 1 leukocyte). Within 72 hours of starting symptoms, she was neurologically asymptomatic. Our final diagnosis was an inflammatory encephalopathy related to a SARS-CoV2 infection.

The appearance of SARS-CoV2 was described in December 2019 in China, but it was not until March 2020 when the pandemic reached Spain. Although this virus mainly presents a respiratory involvement, we have observed the appearance of neurological symptoms (headache, myalgia, hyposmia/anosmia, dysgeusia, insomnia) and diseases (stroke, encephalitis, or Guillain-Barré syndrome) (Mao et al., 2020; Li et al., 2020; Helms et al., 2020; De Melo Espíndola et al., 2020).

Concerning the letter by Moriguchi et al., we describe our experience with a case of encephalopathy with an atypical damage on magnetic resonance imaging (MRI) (Moriguchi et al., 2020).

A 56-year-old woman, without previous pathologies, came to the Emergency Department (ED) for cough, fever, and respiratory failure for five days, after returning from a 6-day trip to Venice. Chest radiography shows a large bilateral interstitial infiltrate. The analysis also highlighted lactate dehydrogenase: 537 U/L, C-reactive protein: 76.7 mg/L, v-dimer: 1041 ng/ml, Interleukin-6: 26, and procalcitonin levels: 0.07 ng/ml. Arterial blood gas showed: pH 7.50, pO2: 32.9, and pCO2: 29.4. She did not develop leukocytosis nor kidney failure.

In the first 24 hours, she was admitted to the Intensive Care Unit (ICU) for acute severe respiratory failure, with 70% oxygen saturation despite oxygen therapy, and extensive bilateral pneumonia secondary to SARS-CoV2 (positive protein chain reaction-PCR in nasal exudate). She required intubation for ten days, and received ceftriaxone, ritonavir/lopinavir, corticosteroids, and hydroxychloroquine, with clinical improvement. In the first 48 hours outside the ICU, she developed an acute confusional syndrome (hyperactive delirium). On neurological examination, she exhibited temporal-spatial disorientation, incoherent fluent speech, without other neurological symptoms.

An electroencephalogram (EEG) was performed in the first 48 hours, showing generalized hypovoltaic activity, not related to the drugs present at that time. Cranial magnetic resonance imaging was also performed, which showed a bilateral and symmetrical increase in the signal intensity of the supratentorial white matter, with a discrete thickening of both temporal lobes with a slight increase in signal intensity, and a sequence of normal diffusion (Figure 1). The lumbar puncture showed no changes (glucose 71, protein 30, 1 leukocyte). Within 72 hours of starting symptoms, she was neurologically asymptomatic. Our final diagnosis was an inflammatory encephalopathy related to SARS-CoV2 infection.

We consider the possibility that the demonstrated radiological lesions are secondary to an inflammatory reaction, instead of a tissue injury due to viral invasion.

Conflict of interest, funding source, and ethical approval

The authors declare the absence of conflict of interests and agree with the contents of the manuscript. All the data are original,
they have not been sent for evaluation to any other journal. The data have not been presented in any congress or conferences. No author has received partial or total funding from any public or private institution in relation to this article.

Authors declare the absence of study sponsors in the study design, in the collection analysis, interpretation of data, and the decision to submit the manuscript for publication. We did not have any writing assistance.

This work has been evaluated and approved by the Medical Investigation Commission of our center in April 2020.

References


María José Abenza-Abildúa PhD,*
Susana Novo-Aparicio MDb
Raúl Moreno-Zabaleta PhDc
María Carmen Algarra-Lucasb
Blas Rojo Moreno-Arcones MDd
Miguel Ángel Salvador-Mayaco
Francisco José Navacerrada-Barrerod
Joaquín Ojeda-Ruíz de Lunado

Carlos Pérez-López MDf
José María Fraile-Vicente MDf
Inés Suárez-García PhDg
Eugenio Suarez-Gisbert PHDb
Juan Antonio Palacios-Castaño PhDh
María Teresa Ramirez-Prieto PhDi

\*Neurology Department, Infanta Sofia University Hospital, Madrid, Spain

\#Neuroradiology Department, Infanta Sofia University Hospital, Madrid, Spain

\#Pneumology Department, Infanta Sofia University Hospital, Madrid, Spain

\#Neurosurgery Department, La Paz University Hospital, Madrid, Spain

\#Internal Medicine-Infectious Diseases Department, Infanta Sofia University Hospital, Madrid, Spain

\#Psychiatry Department, Infanta Sofia University Hospital, Madrid, Spain

\#Palliative Care Department, Infanta Sofia University Hospital, Madrid, Spain

* Corresponding author at: Neurology Department, Infanta Sofia University Hospital, Paseo de Europa 34, 28702, San Sebastián de los Reyes, Madrid, Spain.

E-mail addresses: mjose.abenza@salud.madrid.org (M. Abenza-Abildúa), susana.novo@salud.madrid.org (S. Novo-Aparicio), raul.moreno@salud.madrid.org (R. Moreno-Zabaleta), mcarmen.algarra@salud.madrid.org (M. Algarra-Lucas), blas.rojo@salud.madrid.org (B. Rojo Moreno-Arcones), miguelangel.salvador@salud.madrid.org (M. Salvador-Mayo),