

## Neurological infections during the COVID-19 epidemic<sup>☆</sup>



### Neuroinfecciones en tiempos de COVID-19

Dear Editor:

The pandemic caused by the novel coronavirus SARS-CoV-2 and the associated disease (COVID-19) began in Wuhan (China) in December 2019.<sup>1</sup> It has had a profound impact on European countries and continues its relentless spread across the globe.<sup>2</sup> Spain is currently one of the countries with the most recorded cases of COVID-19. The virus causes respiratory symptoms of variable severity, which can be complicated by an uncontrolled inflammatory response that causes interstitial pneumonia and respiratory distress requiring hospital care.

In this context, all medical attention has been redistributed to treat patients with acute respiratory syndromes.<sup>3–5</sup> Neurologists from around the world have adapted to these changing circumstances, and have even moved to the first line of the response to the pandemic.<sup>6</sup> Experience with these patients has enabled identification of neurological signs and symptoms related to this new disease.<sup>7,8</sup> The most frequent are headache, anosmia, ageusia, and generalised muscle pain. Severe manifestations of the disease include altered level of consciousness and stroke secondary to a prothrombotic state.<sup>9</sup> Some authors report a certain level of central nervous system (CNS) tropism<sup>8,10</sup> and even a case of meningoencephalitis.<sup>11</sup> Nonetheless, CNS infection by the typical pathogens continues to occur during the pandemic, and requires early detection and treatment. In the context of the COVID-19 pandemic, these treatable neurological infections may be camouflaged.

We present 3 cases of neurological infection attended at our department during the pandemic:

#### Case 1

The patient was a 56-year-old man who had undergone surgery 2 months earlier for frontoethmoidal haemangiopericytoma; he attended hospital due to a 3-day history of fever, progressing with altered level of consciousness and meningeal symptoms. Cerebrospinal fluid (CSF) analysis detected 880 leukocytes/mm<sup>3</sup> (80% polymorphonuclear), low glucose levels, and high protein levels. The patient was treated empirically with 3 antibiotic drugs; progression was good. The CSF analysis detected *Streptococcus pneumoniae*, which is sensitive to ceftriaxone. Polymerase chain reaction (PCR) testing of a nasal swab sample returned a negative result for SARS-CoV-2.

#### Case 2

The patient was a 64-year-old woman who attended due to a 3-day history of fever, progressing with otalgia and otor-

rhoea of the right ear, holocranial headache, and neck pain. Physical examination revealed right otitis and meningeal signs. Blood analysis revealed leukocytosis with neutrophilia and hyperferritinaemia. Initial chest radiography findings were normal. CSF analysis revealed 730 leukocytes/mm<sup>3</sup> (85% polymorphonuclear), low glucose levels, and high protein levels. PCR analysis of the CSF detected *Streptococcus pneumoniae*. PCR testing of a nasal swab sample detected SARS-CoV-2. The patient was treated with ceftriaxone and methylprednisolone, as well as azithromycin and hydroxychloroquine to treat COVID-19; progression was good.

#### Case 3

The patient was a 67-year-old man who came to hospital due to a week's history of otalgia, skin rash affecting the ear, headache, progressive gait impairment, and fever. Physical examination revealed a cutaneous eruption affecting the central area of the right ear and the right side of the soft palate, ipsilateral facial paralysis, and gait ataxia. CSF analysis revealed 175 leukocytes/mm<sup>3</sup> (90% mononuclear), normal glucose levels, and high protein levels. PCR revealed varicella-zoster virus (VZV) in the CSF. Brain MRI showed inflammation of the right seventh cranial nerve and ruled out vasculitis. The results of the initial nasal swab PCR test were positive for SARS-CoV-2; a second study returned negative results. The patient was treated with intravenous aciclovir for 7 days. Ataxia improved but facial paralysis persisted.

The cases presented above demonstrate that the common neurological infections continue to present either in isolation or camouflaged by symptoms of SARS-CoV-2 infection. Several points should be taken into consideration regarding this issue. Firstly, pneumococcal meningitis is the type of meningitis that most commonly affects adults; increased incidence has recently been reported.<sup>12</sup> Early clinical diagnosis is based on analysis of clinical history to identify possible routes of entry (surgery or otomastoiditis) and thorough physical examination to identify meningeal signs; neither procedure should be neglected during the COVID-19 pandemic.

Secondly, given the high frequency of COVID-19 in the population,<sup>2</sup> co-presence of common neurological infections and respiratory infection with SARS-CoV-2 is not unlikely, but does not imply causality. Third, reactivation of VZV may give rise to meningoencephalitis, sometimes initially manifesting with cutaneous symptoms, in elderly or immunosuppressed patients.<sup>13</sup> Reactivation in the geniculate ganglion of the facial nerve affects the skin region associated with peripheral facial nerve palsy (Ramsay Hunt syndrome).<sup>14</sup> In patient 3, the contradictory PCR results for SARS-CoV-2 caused uncertainty about possible co-presence of both infections, as the patient lacked clinical, analytical, or radiological signs of COVID-19. As no serological test results were available, we were unable to rule out the possibility that he was an asymptomatic carrier of the virus.

Despite the neurological symptoms and the potential for CNS tropism described in several coronaviruses,<sup>7,8,10</sup> neurological infection by SARS-CoV-2 is very rare<sup>11</sup>; the virus has not yet been reported in CSF analysis,<sup>7,9</sup> and it may result from the spread of the virus throughout the body. Pneumococcal and VZV infection of neurological tissues are common<sup>12,14</sup> and high clinical suspicion is warranted. It is

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yet to be determined whether COVID-19 promotes these infections. Nonetheless, CNS infection by SARS-CoV-2 represents a challenge for neurologists, and future studies should address the spread of the virus in the acute stage, as well as possible sequelae.<sup>8</sup>

Finally, the COVID-19 pandemic has forced neurology departments to implement significant structural changes,<sup>4,5</sup> such as the promotion of remote patient assessment.<sup>15</sup> However, neurological infection requires in-person evaluation; therefore, suspicion and detection of these conditions are essential, especially in such circumstances as the current pandemic, in which we may wrongly assume that all febrile syndromes are COVID-19 until this is disproved.

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## The epilepsy unit during the COVID-19 epidemic: the role of telemedicine and the effects of confinement on patients with epilepsy<sup>☆</sup>



### Consulta de epilepsia durante la pandemia de COVID-19: papel de la telemedicina y efectos del confinamiento en pacientes epilépticos

Unlike in other natural disasters, patients have avoided visiting healthcare facilities during the COVID-19 pandemic

as these settings have become a major focus of infection. The same phenomenon was observed during the SARS-CoV and MERS-CoV outbreaks in 2003 and 2012, respectively.<sup>1</sup> This, combined with the risk of exacerbation of neurological diseases associated with SARS-CoV-2 infection,<sup>2,3</sup> results in more pronounced worsening of chronic diseases. In this scenario, telemedicine represents an extremely useful tool.<sup>4,5</sup> In the case of epilepsy, and given the characteristics of these consultations, which are mainly based on clinical history and assessment of symptoms, telemedicine has been shown to be effective for follow-up of these patients.<sup>6</sup> In a recent interview on the subject, Dr Jacqueline French (NYU Langone Medical Center, New York) argued that assessment of epileptic patients can be successfully completed in remote consultations in 99% of cases.<sup>7</sup>

However, the current scenario has increased the risk of treatment discontinuation among patients with epilepsy. To date, only one study has been published on the topic in the context of confinement due to coronavirus disease. In 2005, Shung-Lon et al.<sup>1</sup> published their observations on the impact

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