Symptomatic dialysis disequilibrium syndrome after SARS-CoV-2 infection, about a case

Síndrome de desequilibrio sintomático tras infección por SARS-CoV-2, a propósito de un caso

Dear Editor:

Over the past 2 years, SARS-CoV-2 infection has been associated with alterations in multiple biological systems, including the nervous system.[1,2] Among these alterations, increased thromboembolic risk[3,4] and vascular damage[5,6] are 2 of the acute complications most strongly associated with morbidity in these patients. Furthermore, in vitro studies have shown that SARS-CoV-2 may alter the blood-brain barrier, contributing to its proinflammatory state,[7] which may be associated with such other neurological complications as encephalopathy due to COVID-19 or posterior reversible encephalopathy syndrome.[8,9] Some studies have isolated the virus in the CSF[10]; other post mortem studies have detected infection of neurons or glia.[11]

We present the case of a 25-year-old man with history of Chiari malformation type II associated with myelomeningocele treated surgically after birth, agenesis of the corpus callosum, and severe triventricular hydrocephalus, which led to the placement of a programmable ventriculoperitoneal shunt. He also presented chronic kidney disease due to neurogenic bladder, which had been under treatment with haemodialysis for several years, with no associated complications.

In April 2020, he presented severe bilateral pneumonia with mild respiratory failure secondary to SARS-CoV-2 infection. The patient was admitted to hospital and received treatment with tocilizumab (interleukin-6, 49.7 pg/mL [reference range, 0—7 mg/mL]). During the acute phase, the patient did not miss any haemodialysis session.

Subsequently, and after obtaining negative PCR results for SARS-CoV-2, the patient presented brief episodes lasting several minutes of decreased level of consciousness, bilateral nonreactive pupils, and decerebrate posture, during the first hour of haemodialysis. He presented decreased heart rate during some episodes, and increased respiratory frequency and desaturation in all episodes. Decreased blood pressure was only observed in the first episodes.

The results of an electroencephalography study performed during the events did not suggest epileptic aetiology. The emergency and repeated cranial CT studies performed during several episodes did not reveal changes with regard to previous studies. Transcranial Doppler ultrasound studies performed during the episodes showed a high arterial pulsatility index (PI) in the right middle cerebral artery (mean velocity 43 cm/s, PI 1.93). Due to the anatomical difficulties of the patient, we could not take baseline measurements. We hypothesised that this finding may be caused by an increased resistance of the peripheral arteries, probably associated with intracranial hypertension, during the initial stage of haemodialysis, which may have caused the symptoms. The patient was referred to the neurosurgery department for adjustment (reduction) of the valve pressure, which resolved the symptoms.

Six months after the first episodes, and with no reinfection with SARS-CoV-2, the patient presented further episodes with the same characteristics, requiring further adjustment of valve pressure, which led to a new improvement that had persisted to date.

During the initial stages of haemodialysis, the difference in the velocity of the clearance of such solutes[12,13] as urea may lead to an osmotic imbalance and increased intracranial pressure. This is known as dialysis disequilibrium syndrome.[14] Furthermore, COVID-19 may possibly cause alterations to the blood-brain barrier or to vasoregulatory mechanisms that help to maintain perfusion pressure in the event of pressure changes. The combination of these factors may have caused the symptoms in this case.

Due to the baseline characteristics of our patient, the alterations in intracranial pressure had more marked clinical expression, which may also occur in other patients in subclinical forms. Further studies are needed to clarify this association.

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Conflicts of interest

The authors have no conflicts of interest to declare.

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