Functional neurological disorders in post COVID-19 patients. Case series

Trastornos neurológicos funcionales en pacientes post-COVID-19. Serie de casos

Since the beginning of the COVID-19 pandemic, neurological manifestations have been reported in association with SARS-CoV-2 virus infection, including encephalopathy, encephalitis, stroke, neuropathies, and Guillain-Barré syndrome[1].

Functional neurological disorders (FND), including involuntary movements, tremor, ataxia, motor and sensory deficits, have rarely been reported in patients with post—COVID-19 syndrome[2,3] or after vaccination against SARS-CoV-2[4–6].

In this article, we report 2 clinical cases of patients with FNDs after COVID-19 who were referred to Institut Guttmann for rehabilitation. Patients gave written informed consent for the publication of videos. A third patient requested compensation for participating in the study; this request was declined.

Patient 1

The first patient was a 37-year-old nursing assistant, under treatment for anxiety disorder. He was admitted due to bilateral pneumonia secondary to SARS-CoV-2 infection, and presented respiratory insufficiency requiring non-invasive oxygen therapy and treatment with dexamethasone, remdesivir, levofloxacin, and enoxaparin. Two weeks after discharge, he reported hyperaesthesia of the feet, loss of muscle mass in the bilateral tibialis anterior and gastrocnemius muscles; he also reported that his legs ''collapsed'' when walking, and used a crutch for safety reasons. Suspecting acute inflammatory polyneuropathy, we requested biochemical and autoimmune studies and an analysis of infections, which yielded negative results. Electromyography findings were normal. He attended our centre 6 months later, reporting loss of strength in the legs, difficulty walking, and hyperaesthesia of the feet. The neurological examination revealed slightly decreased strength in the lower limbs (4/5 muscle strength); incongruent gait pattern and lower walking speed, wide-based gait, and reduced arm sway (video 1a); and normal tandem gait (video 1b). Clinical symptoms in a subsequent examination were inconsistent, now presenting a hemiplegic pattern with a slightly flexed arm with reduced sway, and leg rigidity (video 1c). After 2 months of rehabilitation, gait fully recovered but hyperaesthesia of the feet persisted.

Patient 2

The second patient was a 25-year-old nurse under treatment for major depression with suicidal ideation. She was self-isolating at home due to mild COVID-19. Eight days later, she experienced ascending paraesthesia/hypoaesthesia in the left hemibody up to the C5 dermatome, and loss of strength in the left limbs. Given suspicion of myelitis, we requested serum and CSF biochemical and autoimmunity studies and an analysis of infections, which yielded negative results. The brain and cervical-thoracic spinal MRI scan showed normal results. The patient subsequently reported tremor in the left hand and worsening of gait, needing a crutch to prevent falls. Reassessment with a brain MRI scan and motor and sensory evoked potentials in all 4 limbs revealed normal results. She attended our centre 10 months later due to persistent paresis and left hemihypoaesthesia; joint pain; fatigue; headache; attentional, memory, and naming difficulties; and symptoms of anxiety and depression. The neurological examination revealed a hemiplegic gait pattern, requiring the use of a crutch, with the leg in external rotation with support of the inner edge of the foot and dragging behind the body axis, with significant overexertion and excessive fatigue, which suggested functional paresis (video 2a); variable muscle strength in the arm with incongruent and inconsistent symptoms: lack of voluntary movements and resistance during the examination, with ''remitting weakness'' (video 2b); kinetic tremor and ''signs of coactivation'' of agonist/antagonist muscles opposing resistance during the examination, which suggests functional tremor (video 2b). The patient required some help to perform basic activities of daily living. The neuropsychological assessment revealed attentional difficulties, memory and executive dysfunction, and major depressive disorder. After 3 months of rehabilitation, symptoms did not improve.

FNDs account for approximately 5%-10% of primary consultations in neurology[7]. Diagnosis of FNDs is based on the presence of alterations in mobility and sensitivity, which have a significant psychosocial impact but are not compatible with known neurological disorders[8]. Their diagnosis in patients with post—COVID-19 syndrome may be challenging due to the novelty of the infection and the limited understanding of its neurological symptoms. Motor FNDs are characterised by sudden onset, variable motor deficit and muscle tone with distraction, knee buckling, overexertion, fatigue, or excessively slow movements and gait. Sensory FNDs are characterised by a loss of sensitivity in a delimited area, which is incompatible with physiological sensory innervation or clinical/topographical distribution determined by neurological lesions. The pre-existent psychopathology and the stress resulting from SARS-CoV-2 infection and the resulting isolation may be risk factors for the development of FND[9]. The prognosis of FNDs is generally poor, especially in patients with long-lasting symptoms, associated psychological or behavioural disorders, or possible secondary gains; therefore, the literature recommends early diagnosis, informing the patient about their disorder, and the identification of appropriate psychological and rehabilitation interventions[10].

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.nrl.2021.12.002.

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Parsonage-Turner syndrome associated with COVID-19: About 2 family cases

Síndrome de Parsonage Turner asociado a Covid-19: A propósito de 2 casos familiares

We would like to underscore the relevance of the case of Parsonage-Turner syndrome (PTS) secondary to SARS-CoV-2 infection reported by Alvarado et al.,[1] as this syndrome has an incidence of 1.6 cases per 100 000 population. PTS has been associated with viral infections triggering an immune-mediated response against the brachial plexus; however, this case associated with SARS-CoV-2 infection is particularly relevant as the syndrome may constitute a clinical manifestation or neurological complication of COVID-19, even after vaccination.[2,3] Familial aggregation has been observed in PTS, which suggests the involvement of genetic factors.[4] Cases have been reported of hereditary neuralgic amyotrophy, with a clinical phenotype similar to that of PTS, linked to mutations at a locus on chromosome 17q25 (*SEPT9* gene, between the markers D17S1301 [centromeric] and D17S784 [telomeric]). However, and unlike in PTS, hereditary neuralgic amyotrophy presents from the second decade of life, and a founder effect has been described in families from the United States.[4,5] Few candidate gene studies have been conducted for PTS. Previous studies helped us to establish the clinical diagnosis of familial neuralgic amyotrophy in a rural setting in 2 siblings with SARS-CoV-2 infection (beta variant, PANGO lineage B1.1.35, clade GH/501Y.V2 [clade-specific TaqMan RT-qPCR]), a man and a woman aged 44 and 45 years, respectively. Both patients presented severe pain in the left shoulder associated with a tingling sensation; the physical examination detected atrophy of the deltoid, supraspinatus, and scapular muscles. They also presented odynophagia, fever of 40°, and palatopharyngeal vesicular enanthem (an early finding of COVID-19)[6]; anteroposterior chest radiography revealed ground-glass opacification. Electromyoneurography revealed abnormal postganglionic sensory nerve action potentials in the left brachial plexus at the level of the trunk and cervical vertebrae, from the C2 to the C5 nerve roots, suggestive of acute brachial plexopathy. Both patients were intolerant to corticosteroids. They gave informed consent to treatment. They were treated on an outpatient basis, receiving ciclosporin A dosed at 5 mg/kg/day for 3 days (this drug may inhibit viral replication, blocking 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine, which prevents mitochondrial dysfunction associated with COVID-19 and blocks the cytokine storm, inhibiting the calcineurin inflammatory pathway and NF-kB[7]), ivermectin 6 mg/12 h for 7 days, azithromycin 500 mg/day for 5 days, lopinavir/ritonavir 2 tablets/12 h for 14 days, subcutaneous interferon-

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