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Orthostatic tremor secondary to recreational use of solvents[☆]



Temblor ortostático secundario al uso recreativo de disolventes

Dear Editor,

Organic solvents are volatile organic compounds used to dissolve raw materials or residual products. Their uses include cleaning agents, glues, paint components, plasticisers, and many other industrial purposes. Since these compounds are widely available, they may be used as psychostimulants; this tendency is more frequent in developing countries.

Our patient is a 30-year old former cocaine user. He had an 8-year history of bilateral optic neuritis with no known aetiology. He visited our emergency department due to frequent falls and gait disturbances which had evolved over 2 years to such an extent that he needed support to walk. Gait disturbances were initially attributed to probable epileptic myoclonic seizures (with normal EEG) and therefore treated with levetiracetam 500 mg/12 h. Treatment failed to control symptoms and provoked side effects which led the patient to stop taking the medication. Considering treatment failure in the context of the patient's age and degree of limitation, we decided to hospitalise him for further study.

Physical examination revealed that the patient was oriented in time and space, with no alterations in speech structures or content. Cranial nerves were unaffected. No motor or sensory alterations were observed in the limbs. He displayed upper limb tremor that was predominantly intention tremor with a postural component; it disappeared at rest and was compatible with tremor of cerebellar origin. Lower limbs showed orthostatic tremor in the proximal segment and a typical helicopter sign, which also provoked gait instability; the patient attempted to compensate with a wider stance. Tremor in the lower limbs was absent with the patient in the supine position or when seated. The patient also showed symmetrical hyperreflexia of the lower limbs.

Electroencephalography, electroneurography, and lumbar puncture procedures all yielded normal results. The electromyogram showed rhythmic muscle activity (tremor) at a frequency of 15 Hz.

Brain MRI revealed FLAIR sequence hyperintensity in both posterior limbs of the internal capsules, especially on the

anterolateral pons. The T2-weighted sequence also showed hyperintense lesions on both pyramidal tracts at the brainstem level and a hypointense lesion at the mesencephalic level in the red nucleus and substantia nigra (Figs. 1 and 2).

A few days after the patient had been admitted, a relative informed us that the patient had been inhaling gasoline fumes for several years (8 approximately) and strongly suspected that he was still doing so without being able to speculate about the frequency. Considering findings from the physical examination and the neuroimaging study, and the patient's history of inhaling gasoline fumes, we established a diagnosis of orthostatic tremor secondary to solvent inhalation (gasoline vapour). Starting clonazepam as symptomatic treatment of orthostatic tremor achieved excellent results. The patient was discharged a few days later. In subsequent follow-up visits, the patient indicated having stopped inhaling solvents but still needed clonazepam treatment to lessen symptoms of tremor.

We believe that the optic neuritis of unknown aetiology may also have been due to recreational use of organic solvents.

Discussion

Literature on central nervous system lesions caused by exposure to volatile organic compounds is scarce. The most widely studied substances are aromatic hydrocarbons (such as toluene) and other hexacarbon solvents, since they are readily available and present in household chemicals.¹

The typical lesions to the nervous system caused by exposure to volatile substances usually include peripheral neuropathy, optic neuritis, and neurosensory hearing loss. Nevertheless, white matter lesions typically follow long-term exposure to hydrocarbons, as shown by the many case studies reporting these findings.²

Lesions caused by long-term toluene exposure are visible in brain MRI, which may reveal white matter hyperintensities in T2-weighted sequences. These findings are more apparent in the posterior limbs of the internal capsules, cerebral peduncle, ventral pons, and middle cerebellar peduncles.³ Basal ganglia may appear hypointense.⁴ Cases of degeneration of the corpus callosum secondary to recreational use of solvents have been described in very recent studies.⁵ Cocaine consumption can also cause white matter lesions that are observable with brain MRI; however, these lesions differ from those secondary to toluene in that they are predominantly located in the frontal lobe, with the brainstem and cerebellum usually remaining intact.⁶

Symptoms of white matter involvement may include orthostatic tremor⁷ (seen in our patient), intention tremor, falling, ataxic gait, dysarthria, wide stance, instability, bal-

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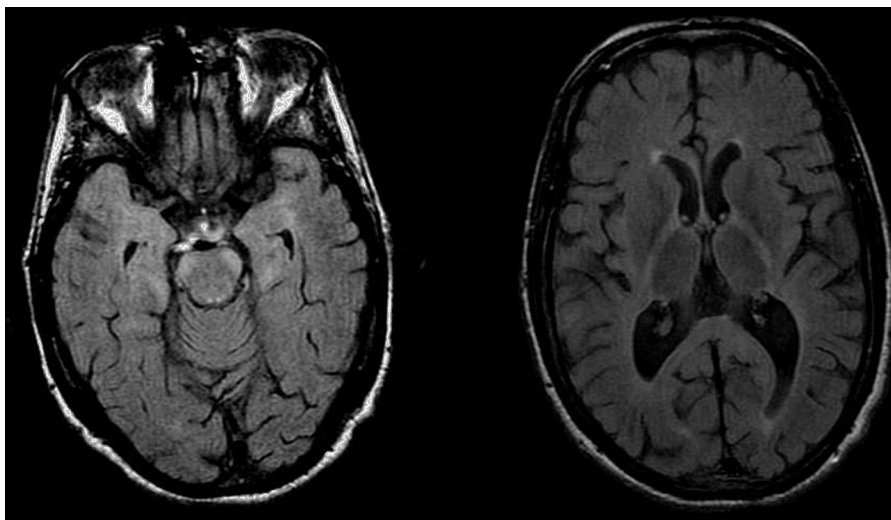


Figure 1 FLAIR sequence brain MRI shows mild hyperintense lesions on both posterior limbs of the internal capsule, with more apparent lesions on the anterolateral pons.

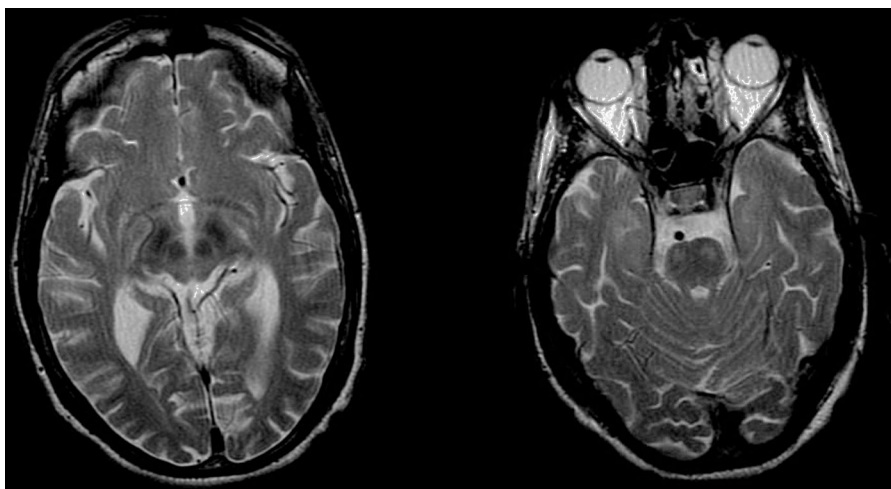


Figure 2 T2-weighted brain MRI shows hyperintense lesions on both pyramidal tracts at the pontine level and hypointense lesions at the mesencephalic level in the red nucleus and substantia nigra.

ance disturbances,⁸ paraparesis, peripheral neuropathy,⁹ and impaired concentration and abstract thought, as well as alterations in reading, writing, and speech content.¹⁰ Such pyramidal signs as hyperreflexia and spasticity may manifest as symptoms.

Studies have been conducted on neurological and neuropsychological impairment in adolescents who abuse volatile substances and in workers exposed to hydrocarbons on the job,¹¹ and they point to statistically significant differences between the exposed cohort and the unexposed group. Furthermore, damage to the dopaminergic pathway has been demonstrated in exposed subjects,^{12,13} and they have been shown to exacerbate secondary parkinsonism in some cases.¹³

Patients with isolated orthostatic tremor may take clonazepam or gabapentin as symptomatic treatment. Primidone, valproic acid, mistazapan, and acetazolamide may also be used as treatment alternatives.¹⁴

Clinical symptoms may subside provided that the patient stops consuming solvents completely and as early as possible.¹⁵ If not, damages to the CNS become irreversible.¹⁶

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