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Neuropsychiatric manifestations as an initial presentation of cerebral venous thrombosis: two case reports and literature review

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Abstract

Cerebral venous thrombosis (CVT) is the involvement of the venous sinuses due to the formation of clots that occlude the cerebral veins. It is a rare cause of cerebrovascular disease, accounting for 0.5-1% of cases, with a higher frequency in women under 50 years of age. The most common symptoms are headache, papilledema, seizures, motor and sensory deficits, cranial nerve paresis, and alterations in mental status. Cases with neuropsychiatric manifestations, such as delirium, cognitive impairment, and mutism, have been reported as isolated presentations, although these are limited. Two cases of CVT are presented, both of which exhibited neuropsychiatric manifestations characterized by erratic behavior, aggression, disorientation, depressive, and catatonic symptoms. Treatment for CVT includes addressing the underlying cause, controlling symptoms, and initiating anticoagulation, which has significantly reduced mortality. CVT presenting with mental status alterations without focal neurological deficits is uncommon. In these cases, a temporal association between symptoms and vascular pathology was observed. Although neuropsychiatric manifestations are rare, CVT should be considered in atypical presentations of common diseases.

Keywords: *Intracranial thrombosis. Stroke. Cognitive dysfunction. Delirium. Catatonia.*

Manifestaciones neuropsiquiátricas como presentación inicial de la trombosis venosa cerebral: dos reportes de caso y revisión de la literatura

Resumen

La trombosis venosa cerebral (TVC) es la afectación de los senos venosos por la formación de coágulos que ocluyen las venas cerebrales. Es una causa infrecuente de enfermedad vascular cerebral con 0.5 al 1% de los casos, con mayor frecuencia en mujeres menores de 50 años. Los síntomas más frecuentes son cefalea, papiledema, crisis epilépticas, déficits motores y sensitivos, paresia de los nervios craneales y alteraciones del estado mental. Se han reportado casos con manifestaciones neuropsiquiátricas como manifestaciones aisladas, representadas por delirium, deterioro cognitivo y mutismo, sin embargo, son limitados. Se presentan dos casos de trombosis venosa cerebral que presentaron manifestaciones neuropsiquiátricas caracterizadas por conducta errática, agresividad, desorientación, síntomas depresivos y catatónicos. El tratamiento de la TVC incluye abordar la causa subyacente, controlar síntomas e iniciar anticoagulación, lo que ha reducido

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la mortalidad significativamente. La presentación de la TVC con alteraciones del estado mental sin déficits neurológicos focales es poco común. En estos casos, se observó una asociación temporal entre los síntomas y la patología vascular. Aunque las manifestaciones neuropsiquiátricas son inusuales, el diagnóstico de TVC debe considerarse en presentaciones atípicas de enfermedades comunes.

Palabras clave: *Trombosis intracraneal. Infarto cerebral agudo. Deterioro cognitivo. Delirio. Catatonia.*

Introduction

Cerebral venous thrombosis (CVT) is a rare but potentially serious condition that involves the formation of a blood clot in the veins draining the brain. Although its incidence is relatively low compared to other cerebrovascular disorders, CVT accounts for 0.5% to 1% of patients with cerebrovascular disease[1]. In Mexico, the National Mexican Registry of Cerebrovascular Disease reported a prevalence of 3%[2].

The dural venous sinuses are large trabecular channels lined with endothelium that collect blood from the brain's surface, deep regions, and the posterior fossa, due to their intracranial course. Specifically, the dural venous sinuses (such as the superior sagittal sinus) drain into the lateral sinuses and ultimately into the internal jugular veins. In addition, these sinuses facilitate the removal of cerebrospinal fluid (CSF) via arachnoid granulations. When clots form in these sinuses, it is referred to as dural venous sinus thrombosis[3].

The most common age of onset for CVT is before 50 years, with a higher incidence in women[4]. The risk factors for developing CVT can be divided into acquired and genetic predisposition categories. Acquired risk factors include the use of oral contraceptives, pregnancy, puerperium, infections, neoplasms, vasculitis, traumatic brain injury, and central nervous system disorders. Genetic risk factors include hereditary thrombophilias or genetically heavier neoplasms. Approximately 85% of patients with CVT have an underlying prothrombotic condition[5].

The clinical presentation of CVT differs from that of more common forms of arterial origin cerebral infarction[5,6]. Four typical patterns of presentation have been identified, in order of frequency: (1) Focal neurological alterations (including focal seizures); (2) Isolated intracranial hypertension; (3) Subacute encephalopathy; (4) Cavernous sinus syndrome[7]. Less frequently, atypical presentations such as transient ischemic attack, chronic progressive optic neuropathy without associated headache[8], and psychiatric symptoms are observed. Neuropsychiatric manifestations in CVT patients are rare. In the International Study of Cerebral Vein and Dural Sinus Thrombosis, 22% of patients exhibited mental status alterations. Behavioral symptoms such as delirium, dementia, and mutism have also been reported as isolated manifestations[9].

Therefore, two cases of patients with CVT presenting with neuropsychiatric manifestations are described below.

Case 1

A woman in her third decade of life, without any risk factors. She began with a decrease in sleep requirements and erratic behavior. This was followed by verbal and physical aggression, along with increased purposeful activity. Her speech became disorganized, and she was admitted to the neuropsychiatry unit. Upon initial evaluation, she exhibited psychomotor agitation, disorganized speech, and soliloquy. Neurological examination showed no focal sensory-motor deficits. The brain computed tomography scan was reported as normal. CSF analysis revealed an opening pressure of 30 cm H_2O, glucose 72, protein 24, and 1 cell. Initial treatment consisted of olanzapine 20 mg/day and lorazepam 6 mg/day. Venous magnetic resonance imaging (v-MRI) showed filling defects in the left lateral sinus, extending to the ipsilateral sigmoid and jugular sinuses, consistent with thrombosis (Fig. 1), and thus management with enoxaparin 80 mg every 12 h was initiated, progressing to oral anticoagulation with acenocoumarin. At 30 days, the patient showed improvement, with oxcarbazepine 450 mg/day as a mood stabilizer and acenocoumarin 4 mg/day. Control v-MRI at 6 months did not show recanalization of the thrombotic sinus; however, there were no changes in the cerebral parenchyma (Fig. 1). Other studies performed to investigate etiology were normal. During the 12-month follow-up with neuropsychiatry, complete remission of the symptoms was maintained.

Case 2

A man in his second decade of life, without significant medical history related to the current condition. He presented suddenly with temporospatial disorientation,

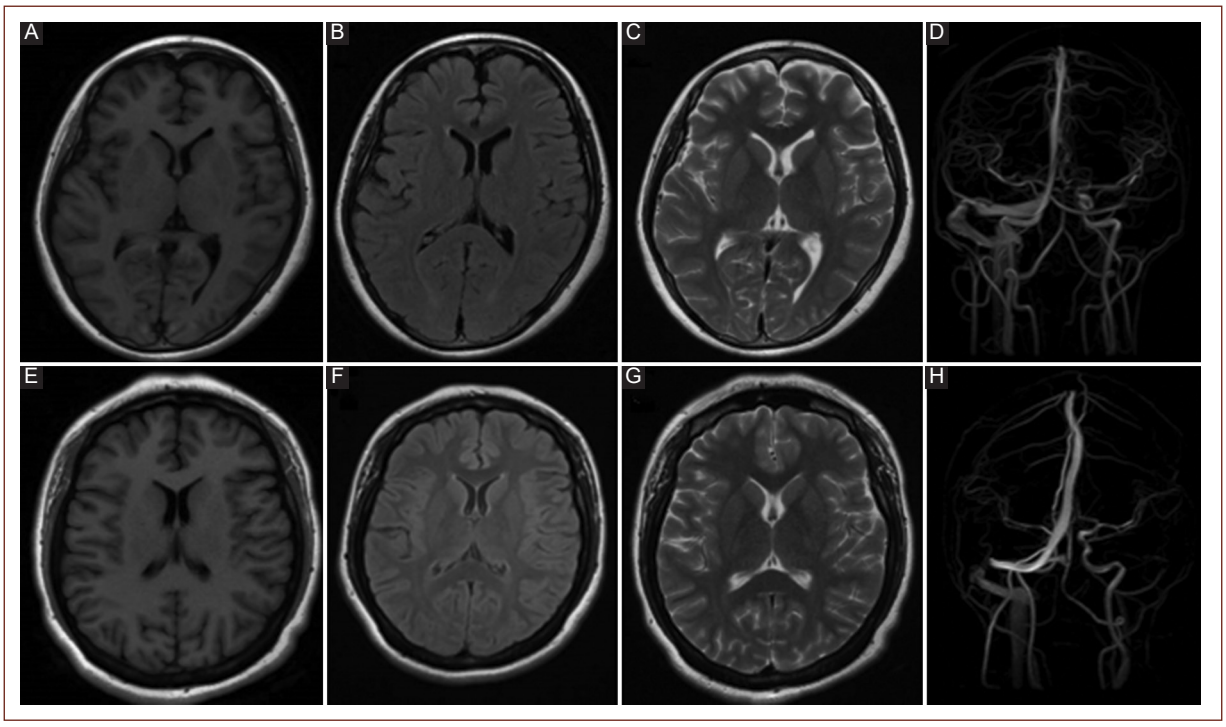

Figure 1. Magnetic resonance imaging (MRI) scans of two patients. **A-D** correspond to patient 1. **A:** magnetic resonance imaging (MRI) patient 1. **B:** T1 FLAIR. **C:** T2 FLAIR. **D:** T2W with no evident parenchymal lesions. **E-H** correspond to patient 2. **E:** venous MRI (v-MRI) shows absence of left lateral sinus in patient 2. **F:** T1 FLAIR. **G:** T2 FLAIR. **H:** T2W with no evident parenchymal lesions. v-MRI shows the absence of the left lateral sinus.

bradyphasia, hypophonia, sad mood, and bradykinesia. During his hospitalization, he developed catatonic symptoms, including mutism and maintenance of fixed postures. Additional signs included fixed gaze, catalepsy, and withdrawal. Routine laboratory studies and a simple cranial CT scan were normal. A lumbar puncture was performed, revealing an opening pressure of 320 mm H_2O, protein 29, glucose 54, and two leukocytes. Due to the finding of intracranial hypertension, v-MRI was performed, showing thrombosis of the left lateral sinus (Fig. 1). Treatment with enoxaparin 60 mg every 12 h was initiated, followed by oral anticoagulation with acenocoumarin 4 mg/day. Fluoxetine 20 mg/day and modafinil 400 mg/day were started, resulting in psychiatric symptom improvement 1 month later. To determine the etiology of venous thrombosis, prothrombotic studies and an immunological profile were performed with negative results. The control v-MRI at 6 months demonstrated partial recanalization of the left lateral sinus (Fig. 1).

Discussion

The presentation of CVT with mental status alterations, in the absence of focal neurological deficits, is rare[10]. In a series of 62 patients with isolated lateral sinus thrombosis, a 5% prevalence of mental status alterations was reported, suggesting an atypical presentation[11].

In older individuals with thrombosis of the deep cerebral venous system, the most commonly reported mental status changes are somnolence and acute confusional state, with no cases reported in younger patients[12,13]. This study describes two cases of young patients with neuropsychiatric manifestations as the initial presentation of lateral sinus thrombosis. Both patients presented with an acute onset of symptoms, including intracranial hypertension and either a manic or catatonic presentation. Bousser et al. reported that patients with neuropsychiatric manifestations tend to have a better prognosis[14].

Most cases of mania associated with cerebrovascular disease occur in lesions of the right hemisphere, seen in up to 68% of cases, whereas only 15% are associated with lesions in the left hemisphere[14]. In contrast, the presentation of catatonia is often linked to lesions within the anterior circuit cingulate[15]. In the cases presented, the temporal association between the onset of symptoms and vascular pathology is

clear, though it is important to note that no parenchymal lesions were observed, and the left lateral sinus was affected (Fig. 1). In both cases, thrombosis of the lateral sinus, which drains blood from the cerebellum, brainstem, and the posterior part of the cerebral hemispheres, was identified. The venous thrombosis likely resulted in reduced venous drainage, contributing to dysfunction in these regions and potentially causing symptoms such as bradyphasia, temporospatial disorientation, and disturbances in the sleep-wake cycle. Literature has described neuropsychiatric disorders, including delusions, disorganized behavior, and visual hallucinations, following remote cerebellar strokes[16], symptoms which were also observed in the present cases.

In more severe cases, impaired venous drainage leads to visible vasogenic edema in imaging studies, accompanied by venous infarctions and associated hemorrhages. The diagnosis of CVT should be considered in patients presenting atypically, once more common causes have been excluded[17].

Conclusion

There is limited literature on neuropsychiatric manifestations in CVT. This review presents two patients diagnosed with CVT who exhibited only neuropsychiatric symptoms as their clinical presentation, manifesting as disturbances in the sleep-wake cycle, bradykinesia, and mood alterations. The diagnosis of CVT can be challenging and sometimes delayed due to the variability in clinical presentation. Psychiatric symptoms can be disabling and misleading in diagnosis, highlighting the need for early recognition and treatment.

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The authors declare that this work was carried out with the author's own resources.

Conflicts of interest

The authors declare that they have no conflicts of interest.

Ethical considerations

Protection of human subjects and animals. The authors declare that no experiments on humans or animals were performed for this research.

Confidentiality, informed consent, and ethical approval. This study does not involve personal patient data, medical records, or biological samples, and does not require ethical approval. SAGER guidelines do not apply.

Declaration on the use of artificial intelligence (AI). The authors declare that no generative artificial intelligence was used in the writing or creation of the content of this manuscript.

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