Letter to the Editor

A Case of Acute Behavioral Disturbance Associated With Vitamin B_{12} Deficiency

To the Editor: Neurologic and psychiatric symptoms are well described with vitamin B_{12} deficiency, and an assay of serum vitamin B_{12} levels is part of standard protocols when investigating cognitive impairment and dementia.[1] Acute behavioral disturbance is, however, not a typical presentation of vitamin B_{12} deficiency.[2] We describe a case of an elderly lady presenting with acute behavioral disturbance associated with vitamin B_{12} deficiency.

Case report. Ms A, a 67-year-old woman, was brought into the hospital in 2009 by the police after she attracted attention driving her car erratically. She was involved in a high-speed police pursuit, and spikes had to be placed on the road to stop her. When she was finally apprehended, the police reported her to be acting irrationally. On arrival in the emergency department, she refused to leave the police vehicle, was aggressive, and had to be physically restrained and sedated with intravenous midazolam and haloperidol at intervals over the next 18 hours. At that time, as far as she could be examined, general and systemic examinations revealed no abnormalities and there were no obvious focal neurologic signs. The initial positive findings were low hemoglobin (107 g/L), raised random plasma glucose (17.8 mmol/L; Ms A is a known type I diabetic), very low serum vitamin B_{12} (79 pmol/L), raised serum folate (39 nmol/L), raised erythrocyte sedimentation rate (42 mm/h), raised cerebrospinal fluid protein (0.7 g/L; traumatic tap), and brain computed tomography showing evidence of demyelinating pathology/chronic small vessel disease.

The family described her as a little stubborn, prone to hoarding old newspapers and letters, untidy on occasions, and an introvert. On closer questioning of the family, there were no symptoms suggesting a functional mood disturbance or psychosis. However, in the preceding 12 months, they had noted a coarse tremor, particularly in her right hand, deteriorating handwriting, and forgetfulness. They also described increased stubbornness and behaviors that would suggest difficulties in shifting attention and neglect. She had continued to work and attend to her day-to-day tasks as usual up until the day of presentation. There was no past or family history of psychiatric illness. There was no history of alcohol or substance misuse.

She was treated with injection vitamin B_{12} 1,000 μg a day. Within 24 hours, her aggression settled, and within 72 hours, it was possible to engage her and she was able to give an account of the events surrounding her presentation. Her memory for events was good and in her description she remembered that she was driving over the speed limit, that she was trying to overtake a truck in front of her, that she had not realized that the police were behind her, and that she was not sure they were "really the police because sometimes people can dress up like the police to hurt you." She also explained that she had always found it difficult to stop what she was doing and did not like being interrupted. Mental state examination at that time revealed no abnormalities. She was extensively investigated. No etiology for B_{12} deficiency was identified. Electroencephalogram (EEG) suggested encephalopathy, and brain magnetic resonance imaging (MRI) showed extensive widespread white matter disease, suggestive of a demyelinating pathology. She was discharged on monthly vitamin B_{12} injections. She received psychotropics only at initial presentation and at no point thereafter. She returned to full-time professional work.

In the present case, abrupt onset of atypical symptoms, age, presence of neurologic symptoms, abnormal findings on investigation, and the absence of a past or a family history of psychiatric illness all strongly suggested an organic etiology. In this case, there was evidence of anemia (without macrocytosis), low serum B_{12}, high serum folate, evidence for demyelination on brain MRI, encephalopathy on EEG, and abnormal visual evoked potentials. Extensive other investigations all revealed no abnormalities. These pointed to vitamin B_{12} deficiency as being etiologic in this case, and this was hypothesized to be nutritional in origin.

The exact nature of the phenomenon that brought her to the attention of the police is unclear. It is not possible to conceptualize this event as a delirium or as an ictal/postictal event because the behavior was too organized and goal-directed and the patient had a clear recollection of events. There was no evidence that the behavioral disturbance was associated with psychotic thinking or substance use. Episodic, abrupt-onset, and brief, agitated violent behavior has been described in isolated cases of B_{12} deficiency,[2] as in this case.

The episode lasted 72 hours, with complete resolution of the behavioral disturbance. The only treatment over this period was daily injections of vitamin B_{12}. Only at initial presentation did she receive a small dose of an antipsychotic agent (2.5 mg haloperidol).

Of interest in this case was the raised serum folate level. Studies suggest that high serum folate can mask hematologic signs and may aggravate neurologic symptoms in patients with B_{12} deficiency.[3]

It is hypothesized that neuropsychiatric manifestations of vitamin B_{12} deficiency result from derangements in the methylation cycle. This results in disruption of the synthesis of methylated products like myelin basic protein and dopa, causing, among other changes, demyelination and disturbed dopamine neurotransmission.[4] In this case, brain MRI showed evidence of demyelination, and one could hypothesize that a disturbance in dopamine neurotransmission that resolved with B_{12} therapy contributed to the acute behavioral disturbance.

Vitamin B_{12} deficiency should be part of the differential diagnosis of acute behavioral disturbance, especially in the elderly, as treatment with parenteral B_{12} therapy can lead to rapid resolution of symptoms.

References

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