Case Report

# An Atypical Neuropsychiatric Presentation of Borderline Vitamin B<sub>12</sub> Deficiency

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rimary care physicians often encounter patients with neurological complaints and pain that are difficult to diagnose. One potential but frequently overlooked cause is vitamin  $B_{12}$  deficiency, particularly when symptoms occur alongside mood/psychotic disorders. Low serum B<sub>12</sub> levels may indicate neuropsychiatric conditions but are often misdiagnosed or underrecognized. This vitamin plays a critical role in the central nervous system, and its deficiency can lead to a variety of manifestations, including megaloblastic anemia, glossitis, cognitive impairment, paresthesia, and deficits in proprioception and vibration.1 However, the relationship between serum B<sub>12</sub> levels and clinical symptoms is not always straightforward, as individuals with borderline B<sub>12</sub> levels (200-300 pg/mL) may still experience significant neuropsychiatric deficits. The National Health and Nutrition **Examination Survey estimates** borderline  $B_{12}$  deficiency at 15%, with higher prevalence in vegetarians, older adults, and those with malabsorption conditions.2-4 This raises concerns about the potential for underdiagnosis given the lack of provider education on the topic. Here, we present a case of neuropsychiatric symptoms associated with borderline B<sub>12</sub> deficiency, despite the absence of expected hematological or clinical signs.

# **Case Report**

A 59-year-old woman with history of depression (on sertraline 100 mg/d), asthma/chronic obstructive pulmonary disease, severe obstructive sleep apnea status posttracheostomy on 2L oxygen, diabetes mellitus, and morbid obesity presented to the emergency department for worsening chest pain over the past month. The pain was burning and radiated all over. Electrocardiogram, vital signs, complete blood count, and comprehensive metabolic panel were unremarkable (mean corpuscular volume was 96.7 fL, within the normal range of 80-99 fL); psychiatry was consulted for new-onset delusions. Per the patient, the pain was due to "lasers" hitting her head, with paranoia about her neighbors. Nonsteroidal anti-inflammatory drugs, lidocaine, gabapentin, or reported increases in sertraline dose ~6 weeks ago did not alleviate the pain. She was neurocognitively impaired, scoring 23/30 on the Montreal Cognitive Assessment,<sup>5</sup> with gross delayed recall impairment, and her family reported that she was "acting differently." There were no prior psychiatric admissions or past neurologic/autoimmune illnesses. Given her age and presentation, primary psychiatric etiology was deemed unlikely. Regardless, aripiprazole was started for delusions. Sarcoidosis or malignancy was initially suspected, given a suspicious chest x-ray ("retrocardiac lobular mass"). However, further imaging showed that this was an enlarged pulmonary artery, likely secondary to severe obstructive sleep apnea. Other potential causes of the patient's pain, including diabetes, thyroid dysfunction, human immunodeficiency virus, and multiple sclerosis, were ruled out. Serum B<sub>12</sub> was found to be borderline deficient at 289 pmol/L. Oral and intramuscular repletion resulted in significant pain improvement. However, her insight remained limited, as she continued to believe her symptoms were laser induced.

Given the patient's extensive medical history, along with symptoms including vague paresthesias, delusions, and cognitive impairment, establishing a diagnosis was difficult. Laboratory tests and imaging ruled out sarcoidosis, paraneoplastic syndromes, and autoimmune etiologies. Borderline B12 levels and response to repletion confirmed the diagnosis. A methylmalonic acid level was ordered but not obtained before discharge. Subsequent chart review revealed multiple risk factors predisposing the patient to  $B_{12}$ deficiency. Her outpatient medications included long-standing metformin and potassium chloride, both of which reduce intestinal absorption.6,7

### Discussion

This is the first published case, to our knowledge, describing borderline  $B_{12}$  deficiency presenting with only neuropsychiatric symptoms. It is unknown why other typical symptoms were not present; however, a perusal of online forums reveal that many other borderline B12-deficient individuals have similar self-reported presentations of paresthesias and cognitive impairment. Prior research has established that B<sub>12</sub> levels within reference ranges do not preclude symptomatic deficiency.8 Clinicians should be aware of borderline  $B_{12}$ deficiency and approach "normal" B<sub>12</sub> levels with caution given the evolving literature.

# **Article Information**

Published Online: April 24, 2025. https://doi.org/10.4088/PCC.24cr03858 © 2025 Physicians Postgraduate Press, Inc. Prim Care Companion CNS Disord 2025;27(2):24cr03858 Submitted: September 25, 2024; accepted January 14, 2025.

**To Cite:** Zhang V, Vuong M, Khan A, et al. An atypical neuropsychiatric presentation of borderline vitamin B<sub>12</sub> deficiency. *Prim Care Companion CNS Disord* 2025;27(2): 24cr03858.

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Relevant Financial Relationships: None.

#### Funding/Support: None.

Patient Consent: Informed consent was obtained from the patient to publish this case report, and information has been de-identified to protect the patient's anonymity.

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