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Letter to the Editor

## **Before Attributing Progressive Ascending Paraparesis to Mild Vitamin-B12 Deficiency, all Differential Causes should be Excluded**

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### **Letter to the Editor**

We read with interest the article by Heavey *et al.* about a 30-year-old man who had been suffering from progressive ascending weakness and sensory disturbances in his lower extremities for two weeks <sup>[1]</sup>. He had a history of drug abuse and frequent recreational use of nitrous oxide <sup>[1]</sup>. As his serum vitamin B12 levels were slightly reduced, the paraparesis was attributed to vitamin B12 deficiency as a result of nitrous oxide abuse <sup>[1]</sup>. The study is interesting but worthy of discussion.

The first point is that we disagree that vitamin B12 deficiency was responsible for the ascending paralysis. The vitamin B12 serum level was 166 pg/mL (n, 200-900 pg/mL) <sup>[1]</sup>. This is only a slight reduction. Many patients have slightly reduced vitamin B12 serum levels but do not develop any symptoms. Such a slight reduction in vitamin B12 levels does not usually cause neuropathy or myopathy. Did the vitamin B12 deficiency lead to megaloblastic anemia?

The second point is that no results from nerve conduction studies (NCS) were reported <sup>[1]</sup>. In order to assess whether the progressive paralysis was due to a disease of the peripheral nervous system (PNS), it would have been essential to perform NCS and needle electromyography. In addition, it would have been important to perform repetitive nerve stimulation at low and high frequencies to rule out a neuromuscular transmission disorder.

The third point is that the patient was not tested for illegal drugs <sup>[1]</sup>. Given the patient's history of drug abuse, including intravenous use and nitrous oxide, suspicion is warranted <sup>[1]</sup>. Which drug did he use intravenously, heroin or cocaine? Given such a history, it would have been essential to test the patient for at least cocaine, heroin, amphetamines, tetrahydrocannabinol, and phencyclidine.

The fourth point is that no cerebral imaging results were reported <sup>[1]</sup>. In order to rule out a central nervous system (CNS) disorder as the cause of ascending paraparesis, it would have been essential to perform a multimodal MRI of the brain with contrast agent and magnetic resonance angiography. Cocaine can cause vasospasm of the cerebral arteries with subsequent stroke <sup>[2]</sup>. In addition, spinal infarction should be ruled out by MRI of the spine.

The fifth point is that the long-term outcome was not reported in detail <sup>[1]</sup>. Did the patient really recover completely after vitamin B12 supplementation? Was the normalization of muscle strength objectively confirmed by a clinical neurological examination?

The sixth point is that a normal cerebrospinal fluid (CSF) examination does not rule out Guillain-Barré syndrome (GBS) <sup>[3]</sup>. CSF markers may be normal, especially at the onset of GBS. The same applies to NCSs. At the onset of symptoms, these may be normal and F-wave responses may still be elicitable <sup>[4]</sup>.

In summary, before attributing progressive ascending paraparesis to mild vitamin B12 deficiency, all other causes should be ruled out.

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