

Cracking the Whippet: A case series looking at treatment of the neurological sequelae of Nitrous Oxide abuse

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The abuse of nitrous oxide (N₂O) is becoming increasingly prevalent within the UK and across the globe. Continued recreational use of N₂O can cause neurological dysfunction through its functional inactivation of vitamin B12.

This case series presents seven cases from a single UK centre between 2016-2020 with neurological complications from N₂O abuse, ranging from myeloneuropathy to subacute combined degeneration of the spinal cord. All patients were aged between 22 and 28 years old (6 male, 1 female). In six of the seven cases the patients admitted to the abuse of N₂O 'whippet' canisters (ranging from 20-500 canisters per session), with the seventh patient presenting following repeated Entonox use after recurrent shoulder dislocations. All patients presented with a combination of sensory and motor disturbance, ranging from paraesthesia and reduced gross/vibration sensation to progressive limb weakness, hypotonia and areflexia. Clinical suspicion in the context of N₂O abuse alongside raised methylmalonic acid, homocysteine and use of imaging and nerve conduction studies were the mainstays of diagnosis. Four patients had methylmalonic acid levels measured with elevated results seen in all of them, ranging from 2289 nmol/L to 9170 nmol/L (reference range <260 nmol/L). Six patients had homocysteine levels measured, with five of the six returning raised results ranging from 31 umol/L to >200 umol/L (reference range <12 umol/L). Vitamin B12 levels were measured in all patients, with normal levels seen in six of the seven patients, thereby highlighting its limited use in diagnosis within this patient group.

All seven patients were treated as inpatients with parenteral vitamin B12 replacement, though individual regimens differed vastly on discharge. Prescriptions ranged from a regimen of 1 mg intramuscular (IM) hydroxocobalamin injections every other day for 8 weeks, to a regimen of 1 mg IM hydroxocobalamin injections every 3 months. None of the seven patients were discharged with the same treatment regimen, with two patients receiving no further vitamin B12 replacement.

This cases series highlights the current lack of consensus in treatment guidelines for patients with neurological complications secondary to N₂O abuse, and the need for improved treatment guidance for clinicians to follow.