

TO THE EDITOR

Subacute Combined Degeneration of the Spinal Cord with a Novel Dysosmia

Deficiency of Vitamin B₁₂ can have many neurologic sequelae including peripheric neuropathy, visual disturbances, mood and memory changes and subacute combined degeneration (SCD) of the spinal cord¹. Macrocytic anemia is also a common finding of B₁₂ deficiency allowing the clinician to arrive at a diagnosis, however neurologic symptoms can be present even in the absence of hematologic changes.

Subacute combined degeneration is a progressive myelopathic condition that is typified by a number of neurologic deficits including sensory abnormalities, proximal to distal paresthesias, weakness, ataxia and gait impairment¹. In addition to exam findings, cervical lesions in the posterior spinal cord can be identified on magnetic resonance imaging (MRI)².

In this report we present a patient with a unique episodic dysosmia characterized by the smell of burned wood, loss of taste, mood disturbance, parasthesias and imbalance. Vitamin B₁₂ therapy reversed or significantly improved all of these symptoms and led to reversal of the laboratory abnormalities and cervical MRI findings.

CLINICAL HISTORY

Presentation: A 69-year-old right-handed male former fire fighter was referred to the neurology clinic at our facility with a three month history of unstable gait, loss of taste and episodic smelling of burned wood. He also reported a three to four year history of tingling and numbness extending to the thighs with similar new onset symptoms in his upper extremities extending to the elbows. The patient described an “electric shock-like sensation” in both hands with neck flexion. Of note, the patient reported the episodic smell of burned wood, lasting four to five minutes without any associated confusion, headache, fatigue or change in the level of consciousness. The frequency of the episodes got progressively worse over three months and it was two to three times per day when we saw him. There were no reported symptoms in the immediate period following these episodes. He also reported a 35 pound weight loss in the prior three months which he attributed to his loss of taste. He also experienced mood swings, anxiety and easy irritability. No reported memory decline.

His past medical history was significant for gout and hypertension. He had no known allergies. His family history was unremarkable for neurologic disease.

Examination: The patient was alert and oriented to person, place and time and his speech and higher mental function were intact despite the reported mood swings and anxiety subjectively. Cranial nerve examination was unremarkable and this included screening of the first cranial nerve. Specifically there was no evidence of optic atrophy. Motor examination demonstrated power of 4+/5 in elbow and hip flexion and the rest was 5/5. There was no atrophy or increased tone in the upper or lower limbs. The patient was hyperreflexic in the upper extremities and areflexic in the lower extremities with downgoing toes. Abdominal reflexes were present.

There was decreased sensation to pinprick up to the mid-forearm and mid-thigh bilaterally in addition to evidence of

hyperesthesia in these regions. There was a profound deficit in vibration sense to the level of the sternum. Position sense was only decreased at the level of the great toes bilaterally. Further examination demonstrated a limb ataxia which was more pronounced on the left than the right and was worse when his eyes were closed. Performance of rapid alternating movements was normal. Gait analysis revealed a wide-based gait and stance with drifting to the left especially when turning. Patient was not able to perform tandem gait and Romberg sign was positive.

Prior laboratory tests were conducted by his family physician a few days before the visit and revealed a reduced Vitamin B₁₂ of 33 (N=>116). Folic acid, CK, electrolytes were normal. CBC showed a reduced hematocrit of 0.368 (N=0.4-0.51). The mean corpuscular volume was 115.7 (N=80-100). Other metabolic indicators of Vitamin B₁₂ deficiency including methylmalonic acid and homocysteine were also high.

Clinical Course: The patient was admitted to hospital given his degree of ataxia and further investigations were performed. A gadolinium enhanced MRI of the brain and spinal cord showed multiple high signal abnormalities within the cerebral hemispheres, and periventricular and deep white matter. Sagittal T₂ weighted MRI of the c-spine shows high signal intensity in the posterior aspect of the cervical cord extending from C1 to the C6-7 disk level (Figure 1). Corresponding axial T₂ weighted images localize the high signal to the posterior columns (not shown). Other investigations including cerebrospinal fluid, vasculitis screening, chest X-ray, neoplastic and paraneoplastic screening, were normal. A gastroenterology consult was initiated



Figure 1: Time of Diagnosis. Sagittal T₂ weighted MR image of the c-spine shows high signal intensity in the posterior aspect of the cervical cord extending from C1 to the C6-7 disk level. Corresponding axial T₂ weighted images localize the high signal to the posterior columns (not shown).

and failed to reveal any abnormality that might account for the Vitamin B₁₂ deficiency. Schilling test part 1 was done and it showed decreased excretion at 2.24% of the Cobalt T-57.

The patient was diagnosed with subacute combined degeneration of the spinal cord and treatment with Vitamin B₁₂ began. Daily intramuscular injections of 1000mcg of B₁₂ were administered for seven days, followed by 1000 mcg per week for four weeks, followed by 1000 mcg monthly for life.

After three days of therapy the patient no longer reported smelling the odour of burned wood. Within one week his gait started to improve and he began to regain vibration sense in the lower extremities. In the subsequent days he demonstrated increased stability during walking, and decreased paresthesias in the limbs. He was further assessed by physiotherapy and occupational therapy where a rapid improvement in balance was noted.

Follow-up

Clinically, L'Hermitte's sign and the paresthesias in his hands and feet resolved. He no longer reported the smell of burning wood, but reported only modest improvements in his general taste. The patient also reports the absence of weakness, as well as the return of mood to his normal baseline. The anxiety and irritability had disappeared as well. Examination revealed complete reversal of vibration sense bilaterally which was a marked improvement from his clinical presentation whereby vibration sense was diminished to the level of the sternum. There was normal position sense of the great toes and deep tendon reflexes were 2+ in the upper limbs and absent in the lower limbs.

Six month follow-up sagittal T2 weighted image post treatment shows resolution of the signal abnormalities in the posterior aspect of the cervical cord (Figure 2). The MRI also revealed no change in the brain with the presence of some white matter changes that were also visible on prior scans. CBC, Vitamin B₁₂ and its metabolites were back to normal as well. Monthly intramuscular injections of B₁₂ continued as the etiology of the B₁₂ deficiency had not been determined. The patient had almost completely recovered from the myelopathy at that time.

DISCUSSION

In this case of subacute combined degeneration (SCD) of the spinal cord, it is shown that B₁₂ deficiency remains problematic despite over 100 years since its recognition¹ and continues to present neurologically diverse symptoms in afflicted patients. The present case is striking because we report a reversible episodic dysosmia characterized as the smell of burned wood in addition to a loss of taste. Furthermore we provide clinical evidence of improved mood and neurologic symptoms as well as MRI evidence of the effect of B₁₂ treatment on the posterior segment of the spinal cord.

'Burnt wood' dysosmia

The loss of taste and smell can be commonly associated with primary cranial nerve disorders, secondary to medications and also due to B₁₂ deficiency. A novel finding of our patient reporting the episodic smell of burnt wood is possibly the first time this has been reported in the setting of SCD. Dysosmias



Figure 2: Six months post-treatment. Sagittal T2 weighted image post treatment shows resolution of the signal abnormalities in the posterior aspect of the cervical cord.

have also been reported under the neurologic background of seizures, malignancy, Parkinson's disease and Alzheimer's disease. We also note that this symptom resolved rapidly upon treatment with B₁₂ which further lends support to the causality of the dysosmia from B₁₂ deficiency. We believe that the level of the abnormality is not peripheral at the olfactory nerve since its examination was normal but rather central at the cortical level. A clear pathophysiological explanation could not be reached but the episodic nature of the symptom could be due the occasional need for vitamin B₁₂ as a cofactor in certain high metabolic states at the cortical level.

MRI findings

We present MRI abnormalities of the posterior spinal cord which have been reported by others²; however it is recognized that these imaging results may not occur in all patients with SCD. In follow up with this patient the lesions were ameliorated and correlated with the clinical improvement of the symptoms. It has been shown elsewhere that MRI changes after B₁₂ therapy may not be temporally correlated with clinical improvements in SCD³. The MRI also showed multiple high signal abnormalities within the cerebral hemispheres, periventricular and deep white matter. The severity of cerebral white matter lesions has been correlated with Vitamin B₁₂ status and the significance of this pathology is likely related to myelin integrity and not due to vascular changes⁴. In the present case the white matter findings had not changed over the course of this patient's treatment. In the only other case to our knowledge, Hemmer et al reported in one patient that while the lesions noted in the spinal cord resolved with cobalamin treatment after 8-12 months, that there were no

changes in the previously observed cerebral lesions⁵. The clinical neurologic significance of these findings as related to B12 deficiency has not yet been determined.

Other features of neurologic recovery

This patient demonstrated early neurologic improvement which continued to six months follow-up. Of note the patient demonstrated changes in his gait, general mood and behaviour. His vibration sense exhibited a marked improvement. On presentation he had reduced vibration sense to the level of his sternum but at six months follow-up he could sense vibration in his feet once again. Most notably however, the patient regained function for daily activity which included a marked improvement in his severely impaired gait observed on his initial presentation to the clinic.

CONCLUSION

Vitamin B12 deficiency continues to demonstrate a wide variety of neurologic symptomatology. We present here findings of a novel episodic dysosmia and document reversal of cervical cord MRI findings with B12 therapy. In patients with diffuse neurologic changes Vitamin B12 deficiency should be considered on the differential diagnosis, particularly in metabolically and nutritionally vulnerable populations. Despite the presence of macrocytic anemia in our patient we should caution against the dismissal of Vitamin B12 deficiency upon its absence. Normal Vitamin B12 level does not rule out its

deficiency as well. Furthermore Vitamin B12 and its metabolites should be investigated in any white matter disease.

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TO THE EDITOR

A Case of Amiodarone-Associated Myoclonus Responsive to Levetiracetam

Amiodarone, a class III antiarrhythmic, is infrequently associated with neurotoxicity. Reported adverse events include peripheral neuropathy, tremor, ataxia, parkinsonism and cognitive impairment.¹ We report a case of a patient with amiodarone-associated myoclonus.

A 90-year-old man with mild dementia presented with involuntary jerks and impaired gait. Past medical history was significant for chronic renal insufficiency, coronary artery disease, aortic valve replacement, and automated defibrillator placement. His chronic renal insufficiency was first diagnosed as a young adult, but his creatinine, although elevated, had remained stable for years without the need for hemodialysis. Two years prior to presentation, the patient was prescribed the antiarrhythmics digoxin and amiodarone. One year after initiating amiodarone, he developed fluctuating, often repetitive, action-induced jerks in his trunk and limbs. Repeated attempts to taper amiodarone from 200 to 100 milligrams (mg) daily resulted in recurrence of cardiac arrhythmias but provided significant improvement in the jerks, which quickly reemerged once the higher dose was reinstated. The Naranjo score² was 10, indicating amiodarone was the definite cause of the myoclonus.

On neurological examination, the Montreal Cognitive Assessment score was 19/30 (normal ≥ 26). Cranial nerve examination was normal except for decreased hearing bilaterally. Sensory examination was intact except for decreased vibratory sensation to the left knee. Coordination testing was normal. Biceps, triceps, and patellar reflexes were 3+ (hyperreflexic) bilaterally. Remaining reflexes were normal with flexor plantar responses. The movement examination showed a low-amplitude postural tremor and myoclonus in the upper extremities with posture and action. Myoclonus was not present at rest, was not induced by sound or touch, and was not associated with alteration of consciousness. The patient could not stand without using his arms to support himself and was unable to transfer to his walker without assistance. While walking, several episodes of negative myoclonus occurred requiring the patient to stop and grip the walker to prevent falling.

Electroencephalogram testing was normal. Magnetic resonance imaging of the brain was remarkable for a right cerebellar lacune and age-related white matter disease and volume loss. Serum tests including thyroid screen and liver function tests were normal. The creatinine level was 1.9 (0.66-1.25 normal range). A brief trial of clonazepam (0.5 mg) was not tolerated due to excessive drowsiness. Levetiracetam was then initiated. After one month of 125 mg twice daily, the patient's family noted improved ability to stand and transfer to the walker. He was titrated to 250 mg twice daily. Myoclonus was