

Dramatic Response of Parkinsonism to a Vegan Diet: Case Report

Introduction

There has been growing interest in the role of gastrointestinal and dietary factors in the therapy and pathogenesis of Parkinson's disease (PD) [1]. We now describe a patient with parkinsonism who experienced a persistent, dramatic clinical improvement after instituting a vegan diet.

Case Report

This 64-year-old man has had depression since his 30's that was treated with the MAO inhibitor tranylcypromine. At age 51 he had onset of urinary frequency/urgency and erectile dysfunction. About 4 years later, he developed bradykinesia, bilateral rigidity, start hesitation, and sudden transient freezing. He was diagnosed with parkinsonism. He did not have tremor, and there were no vascular risk factors. An MRI of the brain was unremarkable.

He could not come off tranylcypromine due to recurrences of depression, and a low dose of carbidopa/levodopa in combination with tranylcypromine led to marked hypertension so the drug was stopped. He was tried on trihexyphenidyl and amantadine with no response and experienced only modest benefit from dopamine agonists. Around age 59 he developed constipation, anxiety, and orthostatic hypotension, which was treated with fludrocortisone. Gait freezing and blood pressure lability increased over time, resulting in frequent falls and transient states of symptomatic hypotension and hypertension. The hypotension was treated with fludrocortisone, salt supplements, and midodrine. The hypertension (>200 mmHg systolic) caused headaches and nausea and was treated with amlodipine. He was rejected for deep brain stimulation surgery because of the possibility that he did not have PD. He was eventually able to switch from tranylcypromine to deprenyl and then tolerated carbidopa/levodopa, which improved the gait problems. Due to wearing-off motor fluctuations, a time-release formulation of carbidopa/levodopa was prescribed with improvement.

About 9 months ago, the patient changed his diet to avoid protein during breakfast and lunch and found that he had a better, more predictable response to levodopa. After 2 months, he adopted a vegan diet and since then has experienced steady and dramatic improvement in his motor symptoms. His gait has returned to almost normal with near complete resolution of freezing and start hesitation. He now runs and ice skates, activities nearly impossible previously, with no difficulty. He was able to reduce levodopa from 2175 mg/day to 1305 mg/day, though symptoms recur when levodopa is reduced further. He has also been able to stop ropinerole and reduce midodrine from 40 mg/day to 22.5 mg/day. The patient was not rechallenged with a regular (non-vegan) diet. The patient's mother had PD without dysautonomia.



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Discussion

Our case had levodopa-responsive parkinsonism characterized mainly by start hesitation, gait freezing, and prominent autonomic dysfunction. The differential diagnosis includes PD with dysautonomia or multiple system atrophy. Vascular parkinsonism is unlikely given the absence of both vascular risk factors and vascular abnormalities on brain imaging. He experienced some improvement on a protein redistribution diet followed by a dramatic improvement on a vegan diet.

We cannot exclude an element of placebo response to the dietary change but there are potential mechanisms to explain an improvement. Orally-administered levodopa is largely absorbed in the duodenum, and factors interfering with absorption such as delayed or erratic gastric emptying, protein-containing foods, small intestinal bacterial overgrowth, and *H. pylori* infection, can impair levodopa absorption and contribute to problems such as dose failures and fluctuations in response to the drug [1]. A protein redistribution diet (PRD) in this patient has been useful, probably by reducing competition from diet-derived amino acids for transport across the intestinal and the blood-brain barrier, as has been described in PD previously [2].

More remarkable, however, was his response to a vegan diet that includes only organic, plant-based foods and eliminates all animal-derived products such as eggs, cheese, and other milk products. The benefits of a vegan diet may be derived from its protein-sparing qualities, which may be stricter and more consistent than the protein redistribution diet he used. A plant-based diet is also generally rich in fiber, which may improve bowel motility, thereby promoting the bioavailability of levodopa [3].

Although its influence on levodopa pharmacokinetics is the most likely mechanism for the fairly quick clinical benefit produced, a vegan diet may have other benefits for PD. These include antioxidative effects,

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anti-inflammatory properties, caloric reduction, and promotion of vascular health [4]. All of these actions are relevant to the current understanding of factors that influence neurodegeneration in PD, and studies have shown that diets with high vegetable and fruit intake are associated with a decreased risk for PD, particularly in men [5-7].

Our case illustrates that a vegan diet may have substantial benefits for patients with PD or related conditions. An improvement in the pharmacokinetics of levodopa is the likely explanation for acute effects, though a vegan diet may also have benefits in slowing the loss of surviving dopaminergic neurons and impacting disease progression [8]. Additional case reports or series and larger-scale, controlled studies are needed to examine these possibilities.

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