INTEGRATIVE MEDICINE

Biotin for multiple sclerosis

Multiple sclerosis (MS) is an autoimmune disease that causes extensive neurologic disabilities in young to middle-aged adults.1 The disability is created by gradual axonal loss due to an increase in inflammatory demyelination and a state of hypoxia within the neuron. Supplements, such as omega-3 fatty acids, vitamin D, and lipoic acid, are frequently used by people with MS.

Recently, biotin has been evaluated in the treatment of MS. Biotin, a B vitamin, is a supplement commonly used to strengthen hair and nails, and is a cofactor for essential carboxylases that regulate mitochondrial and myelin action and structure. Its proposed mechanism of action in MS is based on its enhancement of fatty acid synthesis and energy production in neurons to support myelin repair and to protect against further axonal degeneration.1,2 At 300 mg daily, which is 10,000 times the recommended daily allowance, high-dose biotin is considered to be an active pharmaceutical agent.1

Evidence

A pilot study of 23 patients evaluated the use of biotin in primary progressive multiple sclerosis (PPMS) or secondary progressive multiple sclerosis (SPMS). Dosages ranged from 100 to 600 mg daily and the study duration was between 2 and 36 months. All of the patients had disease progression over the past 12 months. The Expanded Disability Status Score (EDSS) significantly improved in 4 of 23 patients (22%). Overall, 21 of 23 patients (91.3%) exhibited some qualitative or quantitative clinical improvement.3 A French study in 16 centers examined 154 patients aged 18 to 75 years with a diagnosis of PPMS or SPMS. The patients had evidence of spasticity, an EDSS score of 4.5–7, and decline in condition over the past 2 years. Patients were excluded if they had clinical and radiologic evidence of inflammatory activity. Patients were randomized in a 2:1 pattern to receive biotin 100 mg three times daily (MP1003) or placebo for 12 months, and then everyone received MP1003 for another 12 months. Concomitant drugs for MS were allowed, and methylprednisolone was used as rescue therapy. About 40% of patients were receiving concomitant disease-modifying therapy. Patients had neurologic assessments every 12 weeks as well as MRI scans. The mean age was 52 years, with 60% of patients diagnosed with SPMS.

The primary endpoint of disability reversal, noted as a 1 point or greater decrease in EDSS or a 20% or greater decrease in 25-foot walk time, occurred in 12% of patients in the MP1003 group compared to none in the placebo group. The secondary endpoint of EDSS progression at 9 months was 13.6% in placebo as compared with 4.2% in the MP1003 group. At 18 months, progression was 31.7% in the placebo group compared with 9.9% in the MP1003 group. The median 25-foot walk time remained constant with biotin, and increased slightly in the placebo group.2 A larger study was undergoing patient recruitment as of November 2016.4

Safety

The adverse effects of biotin in several MS studies have been mildly to moderately gastrointestinal in nature.2 Of note, evidence suggests that biotin may interfere with certain laboratory tests, especially those measuring thyroid function (the findings may falsely suggest the presence of thyrotoxicosis).5

What to tell patients

At this point, evidence on the safety and efficacy of biotin to slow the progression of MS is preliminary. Before patients take this supplement for MS treatment, they should talk with their neurologist.

References

2. Mult Scler. 2016;Sep 1;[Epub ahead of print]
3. Mult Scler Relat Disord. 2015;4(2):159-69

Gina Villano, 2017 PharmD candidate, University of Rhode Island

Anne L. Hume, PharmD, BCPS, column coordinator (ahumer1@aol.com); Professor of Pharmacy, University of Rhode Island College of Pharmacy, Kingston; and Complementary and Alternative Medicine Section Editor, Handbook of Prescription Drugs: An Interactive Approach to Self-Care, 18th ed. (online at pharmacylibrary.com)