

Use of an Amino Acid to Treat Diabetic Neuropathy

If you have high levels of blood sugar (glucose) for a long time, it can damage your nerves or the blood vessels that carry oxygen to your nerves. Damaged nerves may stop sending messages, may send messages slowly, or may send messages at the wrong times. This damage, called diabetic neuropathy, occurs in about 50% of people with diabetes. Common symptoms include numbness, burning pain, or tingling (ie, “pins and needles” feelings) in your feet, legs, or hands.

The medications currently used to treat diabetic neuropathy treat only the symptoms, not the cause of the problem. Many people do not tolerate these drugs well because of side effects. Researchers hope to identify new drugs that can improve the symptoms of diabetic neuropathy while also slowing, or even stopping, progression (worsening) of the disease.

The study of an amino acid called carnitine has uncovered some exciting discoveries. Our body makes carnitine, and this amino acid is also available in meat. Usually, the body has enough carnitine to maintain its functions, but



some people do not have enough carnitine. These individuals can take a prescription form of carnitine called Carnitor. This drug can be taken in tablet, capsule, or liquid form, and is eliminated from the body through the kidneys.

Some experts have found that carnitine levels are lower in patients who have diabetic neuropathy compared with those who do not have neuropathy. There is also some evidence that carnitine might improve the body's ability to use glucose appropriately and that it might decrease insulin resistance in patients with diabetes. Results from animal studies have suggested that carnitine helps damaged nerve cells to heal. Other data indicate that carnitine may help nerves transport nutrients inside the cells more efficiently. Furthermore, there is some evidence that carnitine may help relieve pain.

So far, only a few studies have evaluated the effects of carnitine in patients with diabetic

FOR MORE INFORMATION

Joslin Diabetes Center
www.joslin.org/beginners_guide_574.asp

National Institute of Diabetes and Digestive and Kidney Diseases
<http://diabetes.niddk.nih.gov/dm/pubs/neuropathies/>

National Institute of Neurological Disorders and Stroke
www.ninds.nih.gov/disorders/diabetic/diabetic.htm

Based on “The Role of Acetyl-L-Carnitine in the Treatment of Diabetic Peripheral Neuropathy” Jeff Evans, Tibb Jacobs, and Emily Evans, *The Annals of Pharmacotherapy*, November 2008, <http://dx.doi.org/10.1345/aph.1L201>. For Our Patients is provided by *The Annals* to help explain the latest research and information relating to your medications. These summaries are for informational purposes only and are not a substitute for professional advice from your personal medical provider. If you have questions about this material, you should discuss it with your physician or pharmacist. This summary may be reproduced without permission for not-for-profit educational purposes only. Any other use must be approved by the publisher. © Copyright 2008, Harvey Whitney Books Company, www.hwbooks.com. FOPE21 DOI 10.1345/fop.1L201

nerve pain. One trial involved 333 patients who had either type 1 (insulin dependent) or type 2 (not dependent on insulin) diabetes and were given either carnitine or an inactive drug for 1 year. Initially, the drug was administered as an intramuscular injection, with 1000 mg given once daily for 15 days; after that, patients took 1000 mg of the drug by mouth twice daily. After 1 year, the nerve cells of patients who received the carnitine conducted messages faster. In addition, this group had less nerve pain compared with the patients who had taken the inactive medication.

Another study looked at the effects of carnitine in 1346 patients who received the medication for 1 year. Some patients in this study took 500 mg by mouth 3 times daily (total of 1500 mg per day), some took 1000 mg 3 times daily (total of 3000 mg per day), and some patients took an inactive pill. Overall, pain was reduced only in the patients who took 3000 mg each day, and greater benefits were observed in patients who had been diabetic for less than 5 years. There was some indication that nerve healing occurred in patients who received 1500 mg daily.

Adverse effects from carnitine in these studies included headache, digestive tract complaints (nausea, vomiting, pain), and nerve pain, but

nerve pain was reported less often in patients who received 3000 mg daily.

Despite the benefits seen in these preliminary studies, there are unanswered questions about carnitine. For example, these studies did not evaluate how often patients needed to use other medications to relieve their nerve pain. Additionally, these studies were conducted only in patients who were not overweight and whose blood glucose levels were relatively well controlled. Therefore, the many people with diabetes who are obese and who do not have well-controlled blood glucose levels may not experience the same benefits. More studies need to be done before carnitine could become a standard treatment for diabetic neuropathy. However, carnitine might be a reasonable option since it may alleviate pain and slow disease progression, and it has few side effects. A daily dose higher than 2000 mg seems to be most beneficial, but patients with kidney failure may need a lower dose. In general, the sooner patients start using carnitine, the better the results seem to be. A trial period of at least 6 months may be needed to determine whether carnitine will work for you. If it does help you, you can continue to use carnitine for as long as you and your doctor feel the medication is working.