

Letters to the Editor

Send letters to afplet@aafp.org, or 11400 Tomahawk Creek Pkwy., Leawood, KS 66211-2680. Include your complete address, e-mail address, and telephone number. Letters should be fewer than 400 words and limited to six references, one table or figure, and three authors.

Letters submitted for publication in *AFP* must not be submitted to any other publication. Possible conflicts of interest must be disclosed at time of submission. Submission of a letter will be construed as granting the AAFP permission to publish the letter in any of its publications in any form. The editors may edit letters to meet style and space requirements.

This series is coordinated by Kenny Lin, MD, MPH, Associate Deputy Editor for *AFP* Online.

Potential Benefits of L-Carnitine as Dietary Supplement

Original Article: Complementary/Integrative Therapies That Work: A Review of the Evidence

Issue Date: September 1, 2016

See additional reader comments at: <http://www.aafp.org/afp/2016/0901/p369.html>

TO THE EDITOR: In their article on complementary/integrative therapies, Dr. Kligler and colleagues reviewed evidence for eight well-studied integrative interventions that family physicians should consider. L-carnitine supplementation should be added to that list. L-carnitine is a conditionally essential amino acid available as an over-the-counter dietary supplement. Patients with underlying liver disease (e.g., nonalcoholic fatty liver disease from obesity) or kidney disease (e.g., diabetic or hypertensive nephropathy) do not produce adequate levels. Intracellularly, L-carnitine transports fatty acids from the cytoplasm to the mitochondria for beta oxidation and energy metabolism.¹ There is a growing body of outcomes data that demonstrates the beneficial effects of L-carnitine in the treatment of coronary artery disease, metabolic syndrome, and obesity.

One meta-analysis of 13 controlled trials including more than 3,600 patients showed that L-carnitine supplementation led to a 27% reduction in all-cause mortality, a 65% reduction in ventricular arrhythmias, and a 40% reduction in angina symptoms in patients after a myocardial infarction.² In addition to its effects on fatty acid metabolism efficiency, L-carnitine has beneficial effects on left ventricular remodeling after an acute myocardial infarction, likely accounting for some of its protective benefit.³ Lipoprotein(a) is a highly atherogenic low-density lipoprotein whose levels are positively correlated to ischemic heart disease. It is notoriously difficult to treat and does not respond to statin therapy. One

meta-analysis of randomized controlled trials (RCTs) demonstrated that supplementation with L-carnitine reduces lipoprotein(a) levels.⁴ According to a meta-analysis of five RCTs including more than 3,000 patients, optimal dosages range from 2 to 3 g daily.⁵

The evidence for benefit and lack of harm from supplementation with L-carnitine is robust enough to warrant further study by investigators and serious consideration by clinicians. Further outcomes data have shown a beneficial role in patients with metabolic syndrome and obesity.⁶ It may be used with other evidence-based interventions such as angiotensin-converting enzyme inhibitors, statins, and aspirin to optimize care in patients with cardiometabolic disease.

AYAZ VIRJI, MD, FAAFP

Dawson, Minn.

E-mail: ayaz1@mac.com

Author disclosure: No relevant financial affiliations.

REFERENCES

1. Marcovina SM, Sirtori C, Peracino A, et al. Translating the basic knowledge of mitochondrial functions to metabolic therapy: role of L-carnitine. *Transl Res*. 2013;161(2):73-84.
2. DiNicolantonio JJ, Lavie CJ, Fares H, Menezes AR, O'Keefe JH. L-carnitine in the secondary prevention of cardiovascular disease: systematic review and meta-analysis. *Mayo Clin Proc*. 2013;88(6):544-551.
3. Iliedeto S, Scrutinio D, Bruzzi P, et al. Effects of L-carnitine administration on left ventricular remodeling after acute anterior myocardial infarction: the L-carnitine Echocardiografia Digitalizzata Infarto Miocardio (CEDIM) Trial. *J Am Coll Cardiol*. 1995;26(2):380-387.
4. Serban MC, Sahebkar A, Mikailidis DP, et al. Impact of L-carnitine on plasma lipoprotein(a) concentrations: a systematic review and meta-analysis of randomized controlled trials. *Sci Rep*. 2016;6:19188.
5. Shang R, Sun Z, Li H. Effective dosing of L-carnitine in the secondary prevention of cardiovascular disease: a systematic review and meta-analysis. *BMC Cardiovasc Disord*. 2014;14:88.
6. Ruggenenti P, Cattaneo D, Loriga G, et al. Ameliorating hypertension and insulin resistance in subjects at increased cardiovascular risk: effects of acetyl-L-carnitine therapy. *Hypertension*. 2009;54(3):567-574.

IN REPLY: We would like to thank Dr. Virji for pointing out the potential benefits of L-carnitine. In fact, it was difficult to select

only eight integrative therapies to include in our review, given the rapidly expanding evidence base for complementary and integrative strategies as primary or adjunctive therapy for many common conditions.

Regarding L-carnitine, we agree that there are substantial potential benefits in patients with acute myocardial infarction in terms of the reduced risk of overall mortality and significant arrhythmia. Further research is needed to determine whether intravenous administration of L-carnitine, which is used in some of the European trials, is necessary to attain this benefit, or whether oral administration is adequate. L-carnitine may also be of some benefit in the treatment of claudication, a condition for which current pharmacologic approaches are not very effective. A recent meta-analysis of 12 studies found an increase in peak walking distance in patients who received L-carnitine.¹

L-carnitine appears to be safe to use for at least one year. There is a theoretic concern that in persons who consume a diet high in meat, L-carnitine may be converted

by intestinal flora to trimethylamine N-oxide, which can promote atherogenesis.² Further research is needed on the long-term cardiovascular effects of L-carnitine supplementation.

The National Institutes of Health's Office of Dietary Supplements provides a library of high-quality fact sheets on the use of nutritional supplements, including L-carnitine, which is an excellent resource for family physicians (<https://ods.od.nih.gov/factsheets/Carnitine-HealthProfessional>).

BENJAMIN KLIGLER, MD, MPH
New York, NY
E-mail: bkligler@chpnet.org

Author disclosure: No relevant financial affiliations.

REFERENCES

1. Brass EP, Koster D, Hiatt WR, Amato A. A systematic review and meta-analysis of propionyl-L-carnitine effects on exercise performance in patients with claudication. *Vasc Med*. 2013;18(1):3-12.
2. Koeth RA, Wang Z, Levison BS, et al. Intestinal microbiota metabolism of L-carnitine, a nutrient in red meat, promotes atherosclerosis. *Nat Med*. 2013;19(5):576-585. ■