

L-Carnitine/Acetyl-L-Carnitine Supplements

Don't Statement: Don't use L-carnitine/acetyl-L-carnitine supplements to prevent or treat symptoms of peripheral neuropathy in patients receiving chemotherapy for treatment of cancer.

Statement of Rationale:

Peripheral neuropathy is a chronic side effect of some chemotherapeutic agents. The incidence of neuropathy varies based on drugs and dosages and administration schedule. Reports of incidence are 64–86% of individuals who receive neurotoxic chemotherapeutic agents (Argyriou et al., 2005; Osmani et al., 2012; Ramanathan et al., 2010).

L-carnitine and acetyl-L-carnitine are nonessential amino acids that have been used as dietary supplements and are available without prescription. Though the exact prevalence of carnitine supplement use among patients with cancer is not known, it has been reported that up to 48% of cancer patients take herbal and dietary medicines after diagnosis (Eichhorn, Greten, & Efferth, 2011). One study of patients with cancer in an ambulatory setting reported that 15.4% used herbal and dietary supplements (Graham et al., 2008). Overall, in 2001 consumers spent \$17.8 billion on dietary supplements (Knapiok et al., 2014).

Research has shown that L-carnitine and acetyl-L-carnitine have not demonstrated effectiveness in prevention or treatment of chemotherapy-induced peripheral neuropathy, and one recent study demonstrated worsening of peripheral neuropathy in those receiving this supplement. The American Society of Clinical Oncology (ASCO) has published a strong recommendation against the use of acetyl-L-carnitine for prevention of chemotherapy-induced peripheral neuropathy.

Nurses need to be aware that many patients with cancer self-medicate and may use various dietary supplements marketed on the internet for peripheral neuropathy, and patients need to be educated about those supplements such as carnitine/L-carnitine that should be avoided.

Background:

There is some medical evidence that acetyl-L-carnitine is of benefit in the treatment of neuropathies in patients with diabetes and HIV. Given these positive findings, administration of acetyl-L-carnitine for prevention and management of peripheral neuropathy in patients being treated for cancer has been examined. One recent article stated acetyl-L-carnitine can reduce the incidence and severity of peripheral sensory neuropathy associated with taxane agents (Ben-Ayre, Pollack, Schiff, Tadmor, & Samuels, 2013), although this is not supported by evidence.

In the public realm, numerous internet sets that sell herbal and dietary supplements have acetyl-L-carnitine available, and the benefits of use stated include weight reduction, fertility improvement, and

improvement in mental and emotional functioning, among others. It is also *specifically* recommended at such sites for symptoms of peripheral neuropathy. People with cancer often self medicate to address their symptoms without informing their physicians. It is important that people with cancer know that this supplement has not been shown to be effective, and given current knowledge, may be detrimental.

Evidence:

Early non-randomized studies suggested that administration of acetyl-L-carnitine improved sensory and motor neuropathies in patients receiving paclitaxel or cisplatin (Bianchi et al., 2005; Maestri et al., 2005). The strength of this evidence was limited by small sample sizes and study designs. A systematic review of interventions aimed at preventing neuropathy caused by platinum-based chemotherapy agents concluded there was insufficient evidence to show effectiveness of various interventions used, including carnitine (Albers, Chaudhry, Cavaletti, & Donehower, 2011). A subsequent double blind, placebo-controlled, multisite, randomized trial demonstrated no difference between study groups at 12 weeks, and more symptoms with L-carnitine ($p = .01$). Functional status was also seen to decline more among those patients receiving L-carnitine (Hershman et al., 2013). Current ASCO guidelines for management of peripheral neuropathy contain a strong recommendation against the use of L-carnitine for prevention of chemotherapy-induced peripheral neuropathy (Hershman et al., 2014).

Based on current evidence, it is important that patients with cancer who are at risk for CIPN be made aware that L-carnitine and acetyl-L-carnitine supplements that are widely available and marketed for peripheral neuropathy symptoms should not be taken. These are not shown to be effective, and may make patient outcomes worse.

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