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Micronutrients and Natural Products: A Current Approach to Diabetes Disease Management

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Patients with diabetes increasingly approach healthcare providers for information on micronutrient (vitamin and mineral) supplementation and other nonconventional treatments (natural or herbal products). It is important to provide accurate information about beneficial and potentially harmful products.

Since patients have unique nutritional requirements, an assessment of the patients' micronutrient needs should be considered. Do not assume that all micronutrients are provided by a well balanced diet. Even individuals following a strict diet suffer from deficiencies due to the way their food is processed, packaged and prepared. It is difficult to ascertain an accurate micronutrient status.

When considering treatments utilizing natural or herbal products, it is important to arm patients with as much scientific knowledge as possible. This helps patients steer clear of unsubstantiated claims about treatments that may in fact be harmful.

Recommended Micronutrients

Vitamin E: Antioxidant which limits lipid peroxidation and offers a plausible mechanism for slowing disease progression. Diabetes places patients under increased oxidative stress due to elevated reactive oxygen species (ROS) generation and impairment of antioxidant protective factors.¹⁰ Further studies are needed to verify the role of Vitamin E in glycemic control.

Ascorbic Acid: A plasma antioxidant important in minimizing circulating ROS and preventing protein glycosylation.² Diabetics suffer from a compromised ability to manage ascorbic acid. They lack normal levels of Vitamin C and are predisposed to increased oxidative damage.¹⁰ Exogenous supplementation offers a mechanism for protection yet conclusive results have not yet been completed. Vitamin C is an aldose reductase inhibitor and prevents tissue damage caused by excess sorbitol.

Chromium: A necessary element in carbohydrate metabolism¹⁰ and is a source of deficiency in diabetics. The deficiency manifests as glucose intolerance and insulin resistance.¹⁰ Biologically active chromium binds to insulin and amplifies its effect. It is difficult to measure serum chromium so deficiency states are inferred.

Magnesium: Hypomagnesemia has been associated with diabetes mellitus since 1953.¹ Magnesium deficiency can exist when serum levels are normal because magnesium works mostly in intracellular spaces. Low levels of magnesium have been reported in 25% of diabetic outpatients and a higher percentage in hospitalized patients.⁴ This has serious clinical implications because magnesium deficiency may intensify or promote many diabetic complications such as atherosclerosis, glycosuria, mineral homeostasis, dyslipidemia, retinopathy, thrombotic tendency, hypertension, decreased insulin release and focal seizures.¹⁻⁴ Diuretic anti-hypertensives may often perpetuate hypomagnesemia. Other drugs that may promote further magnesium deficiency include anticonvulsants, cardiac glycosides, chelators and cycloserine.² The restricted diets which most diabetics must follow often does not allow them to meet the RDA recommendations (270-400mg, adults) for magnesium.



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Micronutrients and Natural Products: A Current Approach to Diabetes Disease Management continued...

Magnesium supplementation has been found to be safe and effective for improvement of diabetic complications⁴, however due to the complication of determining intracellular levels of magnesium, dosing strategies and durations should be done carefully. Large oral doses are safe with normal renal function.³ Magnesium-containing antacids may be a convenient, palatable choice of treatment at 400mg per dose and a dose of 100 to 600mg may be necessary.⁴ The dose-limiting side effect is usually diarrhea.

Vanadium: A compound currently being studied for its insulin-mimetic effects and for its organ protective qualities in diabetic individuals. Vanadium has been shown to improve peripheral glucose utilization, hepatic glycogen content and tolerance to oral glucose intake. A one-year toxicity study reported that vanadyl sulfate treatment “improved or prevented the tissue damage seen in the kidney of diabetic animals.” Vanadium is in early clinical trials to test its safety and efficacy in humans.⁷

Natural or Herbal Treatments

The following natural products were determined safe and effective by the Commission E of the German Federal Health Agency. A recent review of natural products and diabetes did not find any natural products that specifically benefits diabetes.¹¹

Ginkgo Biloba: Used as a peripheral circulatory stimulant which may help patients with foot circulation problems.⁸ It also improves blood flow to the brain, improving memory and concentration.

Capsicum (Capsaicin): FDA approved and found to be effective for topical treatment of pain associated with diabetic peripheral neuralgia.⁶ The herbal compound initially induces the release of substance P, which is the principle chemomediator in the transmission of pain impulses from the periphery to the CNS. However, after 3-7 days at 3-4 applications per day capsaicin depletes the neurons of substance P and prevents the reaccumulation⁵, but it must continue to be used consistently for the pain relief to remain.

Garlic: For elevated cholesterol levels, used to lower blood lipids and inhibit platelet aggregation.⁸ Studies show a decrease in blood cholesterol levels for some people.⁹

Natural Toxic Products

Counsel patients to avoid the following products:

Comfrey: Purported to assist in wound healing.
Effective but unsafe for ingestion since it contains toxic alkaloids.⁸

Borage: Purported to be effective as a diuretic and antidiarrheal.
The safety and efficacy is in question since it contains toxic alkaloids.⁸

Sassafras: Purported to be effective as a stimulant, antispasmodic, antirheumatic and tonic. Considered unsafe and ineffective because the oil contains a carcinogen.⁸

Comprehensive care of patients with diabetes should involve counseling on micronutrient and herbal treatments. As further research follows, scientific evidence will be available on an increasing number of products that may be beneficial to patients. Healthcare providers must strive to meet the needs of patients and continually educate themselves about this new research.

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