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Vitamin B1 Deficiency: Often Overlooked in Heart Failure and Other Conditions

Deficiencies of thiamin (B1) are common among congestive heart failure patients who take "loop" diuretics, but large supplemental doses of the vitamin can quickly restore levels in the body to normal. Those are the findings of two recent studies.

Severe deficiencies of vitamin B1, called beriberi, can cause a variety of cardiovascular symptoms, including heart failure and edema (water retention). Loop diuretics prevent the retention of sodium chloride and reduce edema, but they also interfere with the body's use of thiamin.

Cheryl L. Rock, PhD, and her colleagues at the University of Michigan studied 38 patients suffering from congestive heart failure. Blood analyses determined that eight (21 percent) of the 38 patients were deficient in thiamin—seven of them severely deficient, according to an article in the *Journal of the American Dietetic Association* (May 1995;95:541-4).

The patients also completed questionnaires about their eating habits. After analyzing the results, researchers found 10 of the patients to be deficient in thiamin, three of them severely. The questionnaires also found the entire group of patients to be marginally deficient in thiamin, with patients consuming an average of 0.996 mg daily. The Recommended Dietary Allowance of thiamin is 1.2 mg/day for men and 1.0 mg for women. Even more disturbing, one-third of the patients consumed substantially less than the RDA.

When the researchers compared data from the blood analyses and the

questionnaires, they found that seven of the eight patients with blood deficiencies appeared to have an adequate intake of the vitamin according to the questionnaires. The researchers suggested that questionnaires might overlook many nutritionally deficient people.

In addition, the less thiamin patients had in their blood, the more likely they were to suffer from heart failure, as measured by the heart's ability to pump blood.

In another recent study, a team of

Israeli doctors went a step further: they found that large supplemental doses of thiamin easily made up for a deficiency caused by long-term treatment with furosemide, one type of loop diuretic.

David Ezra, MD, and his colleagues at the Sheba Medical Center, Israel, gave 15 hospitalized patients 200 mg of thiamin intravenously for seven days and another 15 patients a placebo.

After the first week, patients

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Thiamin Deficiency and Delirium

Last year, a study at Beaumont Hospital, Dublin, found a strong association between delirium (characterized by confusion and disorientation) and thiamin deficiency among 36 elderly patients.

Seventy-six percent of the thiamin-deficient patients suffered

from delirium, whereas only 32 percent of the patients with normal thiamine levels did. "Thiamin deficiency is common in elderly patients admitted to hospital and may contribute to the development of delirium," wrote J.N. Lavan, MD, in *Gerontology* (Jan/Feb 1994;40:18-24). □

Thiamin Deficiency and Apparent Infection

In April, at the 24th annual Nutritional Medicine Today conference in Toronto, Derrick Lonsdale, MD, related that inadequate thiamin can sometimes mimic the symptoms of an infection, when tests show no infectious organism.

Lonsdale, who practices medicine in Cleveland, made this observation more than 15 years ago and published his findings in *Developmental Pharmacology and Therapeutics* (1980;1:254-264). In one case, a five-year-old boy had suffered from recurrent fevers and enlarged lymph glands, but he had not responded to antibiotics over a period of three years. Lonsdale prescribed B1 supplements

because of a cluster of blood abnormalities, including excessive levels of folic acid and vitamin B12 (probably due to a metabolic disorder rather than to high dietary levels).

After taking B1, the boy's symptoms quickly disappeared and folic and B12 levels returned to normal. So striking was the boy's response that his mother resisted Dr. Lonsdale's suggestion that they briefly stop B1 supplementation to see what would happen. When she finally consented, and supplementation was withheld, the boy's symptom's returned—only to disappear again when the B1 was

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Low Vitamin C Increases Risk of Infections and Heart Attacks During Winter Months

In the United States and Great Britain, deaths from cardiovascular diseases, particularly heart attacks, increase 25 to 30 percent during the winter months.

The reason? Two British researchers suggest that this increase in deaths might be caused by a cascade of events beginning with a seasonal decrease in the consumption of vitamin C-rich foods. As a result, people become more susceptible to severe wintertime infections, and the body fights these infections through inflammation and higher production of white blood cells—both strongly associated with risk of heart attack.

The link between infection and heart attacks is also supported by a strong correlation between influenza epidemics and heart disease deaths, observed Kay-Tee Khaw, FRCP, and Peter Woodhouse, FRCP, of the University of Cambridge School of Medicine in the *British Medical Journal* (June 17, 1995;310:1559-63).

Last year, Khaw and Woodhouse reported that large numbers of neutrophils (a type of white blood cell) and an increase in fibrinogen (a protein that promotes clotting) were related to infections and respiratory symptoms during winter months.

In their latest study, the researchers looked at the diet and health of 96 men and women ages 65 to 74 living at home. They found that dietary levels of vitamin C decreased from an average high of 90 mg daily in summer to 65 mg daily in winter. The difference was roughly equivalent to eating one less orange a day. At the same time, the number of neutrophils and blood levels of fibrinogen increased sharply.

Khaw and Woodhouse calculated that the lower vitamin C intake increased a person's risk of serious heart disease by about 10 percent. Khaw and Woodhouse

wrote that "vitamin C may not prevent respiratory infection but may modulate the biological response, resulting in a less severe infection."

Although the researchers stopped short of recommending

vitamin C supplements, they did write that an increased consumption of fruit and vegetables may be of value in reducing the severity of infections and the risk of heart attacks. □

Beta-Carotene Absorption from Food May Not Be As Efficient as Thought

Physicians and nutritionists have long recommended consumption of dark-green leafy vegetables as a rich source of micronutrients, including beta-carotene, which the body converts to vitamin A. However, the beta-carotene in leafy green vegetables may not be absorbed as well as most people have thought.

This new view, based on a well-designed study, is controversial. The World Health Organization and UNICEF have long urged that people in developing nations eat leafy green vegetables to prevent or treat vitamin A deficiency.

In the study, a multinational team of researchers gave 175 poor, anemic breast-feeding women in Indonesia one of three types of dietary supplements daily for 12 weeks. The supplements were a stir-fried vegetable naturally containing 3.5 mg (5,833 IU) of beta-carotene, a wafer containing the same amount of beta-carotene, and a plain wafer without beta-carotene. Beta-carotene levels were measured in the women's blood, urine, and breast milk at the beginning and end of the study.

Blood and breast milk levels of retinol, a form of vitamin A, increased significantly among the women eating the enriched wafer—38 percent and 67 percent, respectively. However, vitamin A levels did not increase significantly among the women eating the vegetables or plain wafer, according to an article in *Lancet* (July 8, 1995;346:75-81).

"An additional daily portion of dark-green leafy vegetables did not improve vitamin A status, whereas a similar amount of beta-carotene from a simpler matrix [wafer] produced a strong improvement," wrote lead investigator Saskia de Pee, MSc, of the Wageningen Agricultural University, the Netherlands.

The reason may be that beta-carotene in dark-green leafy vegetables is more tightly bound and less assimilable than it is in fruit or dietary supplements, de Pee suggested.

If true, researchers will have to revise the widely accepted formula for converting beta-carotene to vitamin A, because beta-carotene absorption may vary with the type of food consumed. In addition, animal foods containing vitamin A and supplements containing either vitamin A or beta-carotene supplements might be preferable to vegetables.

"Our findings do not support the long-standing assumption that vitamin A deficiency can be combated by increasing the intake of dark-green leafy vegetables," de Pee wrote. "Consumption of vegetables should never be discouraged because they supply other valuable constituents ... [However,] other food approaches to overcoming vitamin A deficiency, such as the use of foods naturally rich in retinol (eggs, whole fish, and liver) and fortified foods, should be developed further." □

Antioxidants Reduce the Risk Posed By Cholesterol

Simply reducing blood levels of cholesterol is not enough to reduce the risk of coronary heart disease (CHD). People could further reduce their risk of heart disease by eating a diet high in "good" fats, vitamin E, beta-carotene, and flavonoids.

That's the conclusion of researchers who analyzed 25 years of dietary and health data from 12,773 men in seven countries. The study was published in the *Journal of the American Medical Association* (July 12, 1995;274:131-6).

Lead researcher W.M. Monique Verschuren, MSc, of the National Institute of Public Health and Environmental Protection, Netherlands, reported that higher cholesterol levels were associated with heart disease in the United States, Finland, the Netherlands, Italy, Greece, Croatia and Serbia (formerly part of Yugoslavia), and Japan.

A cholesterol level of 210 mg/dL corresponded to a 4 to 5 percent increase in the death rate from heart disease in Japan and Mediterranean Europe (Greece and Italy). However, the same cholesterol level was far more dangerous elsewhere. It translated to a 10 percent increase in the death rate in central Europe, 12 percent in the United States, and 15 percent in Northern Europe.

According to the researchers, men with a cholesterol level generally considered safe—190 mg/dL—were twice as likely to die of heart disease in Northern Europe than in the Mediterranean.

The difference in heart disease risk vis-a-vis cholesterol may very well be related to other aspects of the diet, suggested Verschuren. "Compared with the Northern European and US diets, the Mediterranean diet at baseline contained less meat but more fish fruits, vegetables, and ethanol," she wrote. "The fatty acids consumed in Northern Europe and the United States were pre-

dominantly saturated but in the Mediterranean predominantly monounsaturated. Intake of the antioxidant vitamins beta-carotene and alpha-tocopherol [vitamin E] was highest in Mediterranean Southern Europe. Flavonoid intake was twice as high in Southern Europe...as in Northern Europe and the United States, but was highest in Japan. Intake of flavonoids, polyphenolic substances with antioxidant properties, has been shown to protect against CHD."

Verschuren cited previously published research indicating that oxidized low-density lipoprotein (LDL) cholesterol promotes heart disease more than does cholesterol protected by antioxidant nutrients. In addition, polyunsaturated fats (common vegetable oils) are more prone to oxidation than are

monounsaturated fats (such as olive oil).

"These results indicate that the relationship between diet and cholesterol explains only a part of the relationship between diet and CHD. Dietary factors that influence LDL oxidation and thrombotic [clot-causing] factors are also of great importance."

She concluded, "from a public health perspective it is not enough to focus solely on serum cholesterol levels to decrease the burden of CHD in populations. It appears that reductions in serum total cholesterol levels are not likely to bring cultures with a high CHD risk, such as the United States and Northern Europe, back to a CHD mortality characteristic for the Mediterranean and Japanese cultures unless other factors are also changed." □

Soy Protein, Flavonoids Lower Cholesterol Levels

Substituting some soy for animal protein can lower blood levels of cholesterol—and the higher your cholesterol level to start with, the more dramatic the improvement. That's the finding of a recent meta, or collective, analysis of 730 people and 38 studies on soy consumption and coronary heart disease risk.

Eating 47 grams of soy protein daily significantly decreases total cholesterol, the "bad" low-density lipoprotein (LDL) form of cholesterol, and triglycerides, but not the "good" high-density lipoprotein (HDL) form of cholesterol, according to James W. Anderson, MD, an endocrinologist and nutritionist at the University of Kentucky, Lexington.

He reported in the *New England Journal of Medicine* (Aug 3, 1995;333:276-82) that soy consumption accounted for reductions of 9.3 percent in total cholesterol, 12.9 percent in LDL, and 10.5 percent in triglycerides. Among people with total cholesterol levels above 335 mg

per deciliter of blood, cholesterol levels dropped by 19.6 percent.

The amounts of soy protein consumed varied in the individual studies, but Anderson calculated that 25 grams daily would probably reduce blood cholesterol levels by an average of 8.9 percent and 50 grams by 17.4 percent.

Anderson felt that cholesterol reduction was probably the result of mildly estrogenic soy flavonoids, called isoflavones, in the soy. These estrogens have anywhere from 1/400 to 1/50,000 the estrogenic activity of the actual hormone.

Soy protein is found in soy milk, tofu, soy hamburgers and hot dogs, and other soy products. Anderson wrote that

- 8 ounces of soy milk contain 4 to 10 grams of soy protein,
- 4 ounces of tofu contain 8 to 13 grams of soy protein, and
- 3.2 ounces of soy meat substitute contain 18 grams of soy protein.

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Chile, Capsaicin May Help Control Peptic Ulcers

People with ulcers are generally advised to avoid spicy foods, but two studies suggest that a component of hot peppers might actually protect against peptic ulcers.

Jin Y. Kang, MD, a gastroenterology professor at the National University of Singapore, recently noted that peptic ulcer is more common among Chinese rather than Malay and Indian residents of Singapore. While race might be an influence, recent changes in the incidence of peptic in Singapore

suggested an environment influence.

A number of studies have shown that chile powder and its principal ingredient, capsaicin, protect the gastric mucosal membrane against damage from alcohol and aspirin. So Kang compared the use of chile among Singapore's ethnic groups. He found that the Chinese traditionally use much less chile (chili, chilli) than the Malays and Indians.

So Kang and his colleagues compared the chile-eating habits of 103 Chinese patients with peptic ulcers and 87 healthy Chinese patients. He discovered that the ulcer patients ate chile an average of eight times per month, compared with 24 times per month in the non-ulcer group. Furthermore, the non-ulcer patients ate about 2.6 times more chile per month, according to Kang's report in *Digestive Diseases and Sciences* (March 1995;40:576-9).

In a separate study, Kang found that feeding laboratory animals dietary supplements of chile reduced the damage to gastric mucosal membrane caused by alcohol (ethanol). Pure capsaicin had the same effect, regardless of whether it was ingested or injected under the skin, according to an article in the journal *Gut* (May 1995;36:664-9).

Kang speculated that capsaicin might work by stimulating nerves in the gastrointestinal tract, releasing a hormone that increases blood flow and nourishes the mucosal membrane. He also suggested that capsaicin rather than spicy foods per se might offer the greatest benefits.

Two other recent studies document the benefits of capsaicin. In one, researchers from Bristol-Myers Squibb, Princeton, N.J., reported in the *European Journal of Pharmacology* (D'Alonzo AJ, et al., Jan 16, 1995;272:269-78) was capable of reducing arrhythmias and increasing blood flow to the heart. In the other, an article in the *American Journal of Physical Medicine & Rehabilitation* (Jan-

Feb 1995;74:39-44) described how capsaicin cream relieved chronic neck pain in 23 patients. One patient dropped out of the study after complaining of the burning sensation.

Capsaicin cream has been well documented in the treatment of arthritis and psoriasis. (See THE NUTRITION REPORTER, February 1995.) Such creams are available at health food stores and pharmacies. □

Amino Acid Improves Mental Function

A five-month double-blind study in Italy found that supplements of L-acetylcarnitine improved the memory and behavior of 481 elderly patients with mild mental impairments. The patients received 1,500 mg of the amino acid daily. (Salvioli G, et al, *Drugs and Experimental Clinical Research*, 1994;20:169-76. □

Soy, cholesterol...

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A person could consume approximately 30 grams of soy protein daily by substituting two cups of soy milk for regular milk and eating one soy burger or hot dog. □

Thiamin, Heart Failure...

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receiving IV thiamin had higher blood levels of the vitamin and benefited from a boost in their hearts' pumping ability. Ezra and his colleagues wrote that "administration of the vitamin corrected a subclinical state of thiamin deficiency...No change occurred with placebo, indicating that the hospital diet itself was not sufficient to correct the abnormal thiamin status."

After discharge from the hospital, all 30 patients were given 200 mg of oral thiamin supplements daily for six weeks. The original IV thiamin group continued to improve. By the end of the six weeks, the original placebo group was virtually equal in blood thiamin levels and heart pumping ability, according to an article in the *American Journal of Medicine* (May 1995;98:485-90). □

Thiamin, Infection...

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Lonsdale wrote that "when no evidence of bacterial infection is forthcoming, it [the infection] is generally assumed to be viral in origin, although the difficulties of proving viral etiology make this assumption tenuous in some cases, since laboratory proof is not sought." □

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