Treating Type 2 Diabetes with Thiamine (Vitamin B-1)

In the following article, Substituting Vitamins and Supplements for Pharmaceuticals in Type 2 Diabetes, Stuart Lindsey wonders how many of the symptoms of type 2 diabetes could be due to thiamine deficiency, and the answer is apparently a lot of them. Read the whole thing at Orthomolecular News Service.

The paper referenced (among others) is this: The potential role of thiamine (vitamin B1) in diabetic complications.

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Source

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Abstract

Accumulation of triosephosphates arising from high cytosolic glucose concentrations in hyperglycemia is one likely or potential trigger for biochemical dysfunction leading to the development of diabetic complications. This may be prevented by disposal of excess triosephosphates via the reductive pentosephosphate pathway. This pathway is impaired in experimental and clinical diabetes by mild thiamine deficiency. The expression and activity of the thiamine-dependent enzyme, transketolase—the pacemaking enzyme of the reductive pentosephosphate pathway, is consequently decreased. Correction of thiamine deficiency in experimental diabetes by high dose therapy with thiamine and the thiamine monophosphate prodrug, Benfotiamine, restores disposal of triosephosphates by the reductive pentosephosphate pathway in hyperglycemia. This prevented multiple mechanisms of biochemical dysfunction: activation of protein kinase C, activation of the hexosamine pathway, increased glycation and oxidative stress. Consequently, the development of incipient diabetic nephropathy, neuropathy and retinopathy were prevented. Both thiamine and Benfotiamine produced other remarkable effects in experimental diabetes: marked reversals of increased diuresis and glucosuria without change in glycemic status. High dose thiamine also corrected dyslipidemia in experimental diabetes—normalizing cholesterol and triglycerides. Dysfunction of beta-cells and impaired glucose tolerance in thiamine deficiency and suggestion of a link of impaired glucose tolerance with dietary thiamine indicates that thiamine therapy may have a future role in prevention of type 2 diabetes. More immediately, given the emerging
multiple benefits of thiamine repletion, even mild thiamine deficiency in diabetes should be avoided and thiamine supplementation to high dose should be considered as adjunct nutritional therapy to prevent dyslipidemia and the development of vascular complications in clinical diabetes.