

The Clinical Impact of Fiber Supplementation for the Reduction of Postprandial Blood Glucose and Risk Reduction of Complications from Diabetes

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Source: Diabetes In Control, Issue 15 (1) : 12-18 2000 Aug

Abstract:

OBJECTIVE: The prevalence of diabetes has increased dramatically in recent years¹. However, the role of dietary fiber in blood glucose regulation remains unclear. The purpose of this work was to investigate the acute effects of supplementing the diet with soluble fiber in regards to its glucose and cholesterol lowering thereby reducing the HbA1c and therefore the complications from diabetes. By reducing the HbA1c (Average Blood Glucose) 1%, the DCCT² study showed Type 1 diabetics could reduce the complications of Retinopathy by 38%, Nephropathy by 28% Neuropathy by 35%. The UKPDS³ showed that by reducing the HbA1c in Type 2 diabetics by 0.9% you could reduce any diabetic end point by 12%, reduce any Microvascular end point by 25%, reduce MI by 16%, reduce Retinopathy by 21% and reduce microalbuminuria at 12 years by 34%.

The UKPDS also showed that Postprandial (blood glucose 1-2 hours after eating) glucose is a better indicator of glycemic control than fasting glucose levels⁴. Treatment of postprandial hyperglycemia is critical to achieving optimal outcomes in type 2 diabetes⁵.

The New England JM⁶ 5/2000 showed that a high intake of dietary fiber 50 gms particularly of the soluble type, improves glycemic control, decreases hyperinsulinemia, and lowers plasma lipid concentrations in patients with type 2 diabetes.

METHODS: After 30 days of monitoring fasting and postprandial blood glucose, a base HbA1c (9.2%), cholesterol screen-total cholesterol (210), Triglycerides (299), HDL (35), weight (208lbs.)and blood pressure(145/82), Average Postprandial blood glucose(250mg/dl.), average fasting blood glucose (150mg/dl.) were taken. Fifteen patients (7male/8 female), average age 65, were given 10grams of soluble fiber to be added to their diet of 15-20 grams. Fiber consisted of Guar Gum, Gum Arabic, Locust Bean Gum, Pectin, Oat Fiber (Source of Beta Glucans), and Stevia dispersed in Calcium Carbonate. Five grams were taken twice daily 5-10 minutes prior to eating for 90 days. They continued to monitor fasting and postprandial blood glucose through the study period. At the conclusion of the 90 day period, their levels were measured.

RESULTS: Compliance with the fiber diet and supplementation was excellent. During the 12 weeks of the high-fiber diet and supplementation, mean daily preprandial plasma glucose concentrations were 17 percent lower (95 percent confidence interval). The high-fiber diet and supplementation also lowered the area under the curve for 2-hour plasma glucose concentrations, by 36 percent. The high-fiber diet and supplementation reduced plasma total cholesterol concentrations by 12 percent, triglyceride concentrations by 42 percent, raised high-density lipoprotein cholesterol concentrations by 6 percent, reduced body weight by an average of 6 pounds, lowered blood pressure from 145/82 to 131/77 and lowered HbA1c from 9.2% to 7.8%(1.4 decrease).

CONCLUSIONS: A high intake of dietary fiber, particularly of the soluble type, above the level recommended by the ADA (25-30gm.), improves glycemic control, decreases hyperinsulinemia, and lowers plasma lipid concentrations in patients with type 2 diabetes. Reducing postprandial blood glucose significantly caused a decrease of HbA1c by 1.4%, therefore reducing the complications from diabetes.²⁻⁵⁻⁶

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