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J Am Coll Cardiol, 2008; 51:2141-2149, doi:10.1016/j.jacc.2008.01.059
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CLINICAL RESEARCH: VASCULAR FUNCTION

Sustained Benefits in Vascular Function Through Flavanol-Containing Cocoa in Medicated Diabetic Patients

A Double-Masked, Randomized, Controlled Trial

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Manuscript received November 14, 2007; revised manuscript received January 7, 2008, accepted January 21, 2008.

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Objectives: Our goal was to test feasibility and efficacy of a dietary intervention based on daily intake of flavanol-containing cocoa for improving vascular function of medicated diabetic patients.

Background: Even in fully medicated diabetic patients, overall prognosis is unfavorable due to deteriorated cardiovascular function. Based on epidemiological data, diets rich in flavanols are associated with a reduced cardiovascular risk.

Methods: In a feasibility study with 10 diabetic patients, we assessed vascular function as flow-mediated dilation (FMD) of the brachial artery, plasma levels of flavanol metabolites, and tolerability after an acute, single-dose ingestion of cocoa, containing increasing concentrations of flavanols (75, 371, and 963 mg). In a subsequent efficacy study, changes in vascular function in 41 medicated diabetic patients were assessed after a 30-day, thrice-daily dietary intervention with either flavanol-rich cocoa (321 mg flavanols per dose) or a nutrient-matched control (25 mg flavanols per dose). Both studies were undertaken in a randomized, double-masked fashion. Primary and secondary outcome measures included changes in FMD and plasma flavanol metabolites, respectively.

Results: A single ingestion of flavanol-containing cocoa was dose-dependently associated with significant acute increases in circulating flavanols and FMD (at 2 h: from $3.7 \pm 0.2\%$ to $5.5 \pm 0.4\%$, p

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< 0.001). A 30-day, thrice-daily consumption of flavanol-containing cocoa increased baseline FMD by 30% ($p < 0.0001$), while acute increases of FMD upon ingestion of flavanol-containing cocoa continued to be manifest throughout the study. Treatment was well tolerated without evidence of tachyphylaxia. Endothelium-independent responses, blood pressure, heart rate, and glycemic control were unaffected.

Conclusions: Diets rich in flavanols reverse vascular dysfunction in diabetes, highlighting therapeutic potentials in cardiovascular disease.

Abbreviations and Acronyms

FMD = flow-mediated dilation
 GTN = glycerol trinitrate
 NO = nitric oxide

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