P.O. Box 144345 Austin, TX 78714-4345 ▪ 512.926.4900 ▪ Fax: 512.926.2345 ▪ www.herbalgram.org

HerbClip™

File: ■ Boswellia (*Boswellia serrata*)
■ Type 2 Diabetes
■ Liver Function

HC 061453-510

Date: December 15, 2014

RE: Clinical Effect of Boswellia on Type 2 Diabetes Metabolic Parameters

Ahangarpour A, Heidari H, Fatemeh RAA, et al. Effect of *Boswellia serrata* supplementation on blood lipid, hepatic enzymes and fructosamine levels in type2 [*sic*] diabetic patients. *J Diabetes Metab Disord*. 2014;13(1):29. doi: 10.1186/2251-6581-13-29.

The elevated blood glucose levels characteristic of type 2 diabetes mellitus (T2DM) are associated with hyperlipidemia and increased free fatty acid oxidation, which cause damaging fatty deposits in the liver. The gum resin of boswellia (*Boswellia serrata*) has been found to reduce blood glucose in diabetic rats and blood glucose levels in patients with T2DM.[1] Animal studies have also shown that boswellia has significant antioxidant and hypolipidemic properties. However, no studies have reported on the hypolipidemic effects of boswellia or its effect on liver biomarkers in humans with T2DM. The present study was performed to evaluate the hypolipidemic effect of boswellia on patients with T2DM. The power calculation for α=0.05 and 90% power was 60 patients.

Patients (n = 60) aged 30-48 years with T2DM for > 4 years and a fasting blood glucose of 140-250 mg/dl participated in this study conducted at Ahvaz Jundishapur University of Medical Sciences; Ahvaz, Iran. Patients were excluded if they had hepatic cirrhosis, chronic kidney disease, active proliferative diabetic retinopathy, congestive heart failure, myocardial infarction within 6 months, or were pregnant or lactating women. Patients were instructed not to modify their diet or exercise routine. Patients taking oral hypoglycemic agents were instructed not to change their medication during the study. Half of the patients received 900 mg/day boswellia gum resin in 3 divided doses for 6 weeks, and half were an untreated control group. The boswellia was purchased from local markets in Ahvaz, Iran and authenticated by the Department of Botany at Ahvaz Jundishapur University. The authors do not describe how the boswellia was prepared.

Blood was drawn at baseline and study end to evaluate triglycerides (TG), total cholesterol (TC), high-density lipoprotein (HDL), low-density lipoprotein (LDL), very-low-density lipoprotein (VLDL), serum glutamic-pyruvic transaminase (SGPT, also known as alanine aminotransferase [ALT]), serum glutamic-oxaloacetic transaminase (SGOT, also known as aspartate transaminase [AST]), and fructosamine. The liver enzymes SGPT

and SGOT are commonly used as liver function biomarkers. Fructosamine is used as a measure of glycosylated proteins, an indicator of short term (1-2 weeks) changes in blood glucose. There were no significant differences between groups at baseline.

Compared with baseline, the boswellia group had a significant increase in HDL ($P < 0.05$) and a significant decrease in blood cholesterol ($P < 0.05$), LDL ($P < 0.05$), fructosamine ($P < 0.05$), SGPT ($P < 0.001$), and SGOT ($P < 0.01$) after 6 weeks of treatment. However, there were no significant changes in TG or VLDL compared to baseline. In the control group, only HDL significantly increased ($P < 0.01$) compared to baseline. The authors suggest that the improvements in the boswellia group may be attributed to its hypoglycemic, hypolipidemic, and antioxidant properties. No adverse effects or serious herb-drug interactions were reported.

Compared with the control, the boswellia group had a significant improvement in VLDL ($P < 0.05$), TG ($P < 0.05$), TC ($P < 0.01$), and SGOT ($P < 0.01$) after 6 weeks. However, in contrast to the baseline comparisons, there were no significant changes in HDL, LDL, SGPT, or fructosamine in the boswellia group compared to the control.

The authors do not comment on these anomalies, nor the significant HDL increase from baseline in the control group only. They do not report the SGPT:SGOT ratios which are an important diagnostic for fatty liver.

The authors conclude that consumption of 900 mg/day boswellia may provide "a safe and effective means to decrease the risk factors associated with type2 [*sic*] diabetic subjects" and that the regular consumption of boswellia may help maintain "fructosamine levels, hepatic enzyme activities, and lipid profiles close to normal levels. However, more extensive pharmacological experiments are required." Acknowledged limitations of the study are the lack of controls for diet, exercise, and diabetes patient education from outside sources.

—Heather S. Oliff, PhD

Editorial Comment:
It is shameful that the peer reviewers and editor(s) of the *Journal of Diabetes and Metabolic Disorders* approved this article for publication. The contorted grammar is a formidable barrier to objective scientific review. To wit, "However in spite of distinctive improvement of serum triglyceride and VLDL levels of type2 [*sic*] diabetic patients after supplementation with *Boswellia serrata* in our study, significant difference in our study did not detect varying levels after 6 weeks. … May be grounds for non-significant differences in the factors mentioned can cause in type 2 diabetes."

Reference

[1]Ahangarpour A, Akbari Fatemeh Ramezani A, Heidari H, et al. The effect of *Boswellia serrata* on blood glucose, insulin level and insulin resistance in type 2 diabetic patients. *Daneshvar*. 2013;20(103):11-18.

Referenced article can be found at http://www.jdmdonline.com/content/13/1/29.