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- File: ■ Turmeric (*Curcuma longa*)**  
**■ Boswellia (Indian Frankincense; *Boswellia serrata*)**  
**■ Curcumin**  
**■ Chronic Kidney Disease**  
**■ Inflammation**  
**■ Antioxidant Response**

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**RE: Combination of Boswellia and Curcumin in Chronic Kidney Disease**

Moreillon JJ, Bowden RG, Deike E, et al. The use of an anti-inflammatory supplement in patients with chronic kidney disease. *J Complement Integr Med.* 2013;10(1):1-10. doi: 10.1515/jcim-2012-0011.

Chronic kidney disease (CKD), which affects about 20 million Americans, is expected to rise in incidence because of the increase in diabetes, hypertension, and obesity. CKD is characterized by a chronic inflammatory state, with elevated levels of interleukin-6 (IL-6) and tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ) in all stages of the disease. Patients with CKD also exhibit lower levels of plasma glutathione peroxidase (GPx) and other antioxidant enzymes. In most patients, CKD is not diagnosed early when the disease is asymptomatic, which is of concern because of the relationship between the systemic inflammation of the disease and the risk for cardiovascular disease (CVD). In addition to pharmaceuticals such as statins and angiotensin-converting enzyme inhibitors, complementary and alternative medicine therapies used to treat CKD are gaining interest in the scientific community. The authors conducted a study to evaluate the inflammatory and antioxidant responses of 8 weeks of curcumin (from turmeric; *Curcuma longa*) and boswellia (Indian frankincense; *Boswellia serrata*) supplementation in patients with mild-to-moderate CKD.

Patients at a community health center in Central Texas who were older than 18 years of age and had CKD in stages 1 through 5 were recruited for the study. Patients completed a medical history questionnaire and underwent a general physical examination by their physician to determine eligibility. The patients were randomly chosen to receive an herbal supplement of curcumin and boswellia (824 mg purified turmeric extract, 95% curcuminoids, and 516 mg boswellia extract, 10% 3-acetyl-11-keto- $\beta$ -boswellic acid) or placebo (roasted rice [*Oryza sativa*] powder). The study supplement was added to the patients' existing treatment protocols. The study outcome variables were plasma IL-6, TNF- $\alpha$ , GPx, and serum C-reactive protein (CRP).

The patients participated in 2 testing sessions 8 weeks apart. During session 1, they donated blood after a 12-hour fast and underwent measurements for height, weight, heart rate, blood pressure, and waist and hip circumferences. They were then given an 8-week supply of the supplement or placebo and instructed to ingest 2 capsules daily (1 in the morning with breakfast and 1 in the evening with dinner) and to continue their usual medications. After 8 weeks, the patients returned to the clinic for another blood draw and a pill count to determine compliance. The patients' diets were not standardized; they maintained their normal dietary habits during the study.

Sixteen patients (out of an original 23) completed the study. At baseline, the placebo group (n=7) had significantly higher values for height (P=0.05), body mass index (BMI) (P=0.01), waist circumference (P=0.03), and hip circumference (P=0.02). Glomerular filtration rate (GFR), used to determine kidney function, was not significantly different between the groups. The authors report that baseline data demonstrated elevated inflammation and low antioxidant levels.

A significant time effect (P=0.03; effect size [ES]=0.32) and time × compliance interaction effect (P=0.05; ES=0.30) were observed for IL-6, with a decrease in the treatment group and an increase in the placebo group. No significant group, time, or interaction effects were seen for any of the other outcome variables. Noting that these findings partially support earlier research on the anti-inflammatory effects of curcumin and boswellia, the authors write: "Reasons for [only] partial support of previous literature could be due to a dose-response relationship, short study duration, influence of anti-inflammatory medications, small sample size, or lack of interaction between curcumin, *Boswellia serrata*, and some markers of inflammation." CRP and IL-6 have been shown to be significantly correlated.<sup>1</sup> The authors explain that the lack of change in CRP in this study may be due to the high prevalence of nonsteroidal anti-inflammatory drug use by the study subjects, as most patients were taking aspirin to reduce the risk for myocardial infarction, which may have inhibited curcumin's effectiveness against CRP.

According to the authors, the lack of a statistical change in GPx levels may be due to the study duration and sample size: "A supplementation period of 8 weeks may have been of insufficient magnitude to observe changes in GPx, and the sample size used in the present study was small, with larger studies needed to determine if curcumin's antioxidant benefits observed in animal studies carry over to humans."

Only minor adverse side effects were reported during the study.

These results support those of previous studies suggesting that CKD is associated with an ongoing inflammatory state and impaired antioxidant activity. The study treatment was well tolerated and resulted in decreased inflammation as measured by IL-6; however, no changes were observed in any other inflammatory or antioxidant markers.

—Shari Henson

#### Reference

<sup>1</sup>Heinrich PC, Castell JV, Andus T. Interleukin-6 and the acute phase response. *Biochem J.* 1990;265(3):621-636.

The American Botanical Council has chosen not to include the original article.

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