Effects of Black Raspberry on Lipid Profiles, Vascular Endothelial Function and Circulating Endothelial Progenitor Cells in Patients with Metabolic Syndrome

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Background:
Black raspberry (*Rubus occidentalis*) has been known for its anti-inflammatory and anti-oxidant effects. However, short-term effects of black raspberry on lipid profiles and vascular endothelial function have not been investigated in patients with metabolic syndrome.

Methods:
Patients with metabolic syndrome(n=77) were prospectively randomized into the black raspberry group (n=39) and placebo group(n=38) during the 12-week follow-up. Dried unripe black raspberries were made into capsules containing black raspberry powder, and black raspberry powder(750mg/day) or placebo was administered. Lipid profiles, brachial artery flow-mediated dilatation(baFMD), circulating levels of endothelial progenitor cells such as CD34/KDR+, CD34/CD117+, CD34/CD133+ cells, and inflammatory cytokines such as IL-6, TNF-alpha, C-reactive protein, adiponectin, ICAM-1, VCAM-1 were measured at baseline and at 12-week follow-up.

Results:
Baseline patient characteristics such as mean ages and body mass index were similar between the 2 groups. Decreases from baseline in total cholesterol levels (-22.8±30.4mg/dL vs. -1.9±31.8mg/dL, p0.05, respectively) were significantly greater in the black raspberry group when compared to the placebo group. Decreases from baseline in IL-6 (-0.4±1.5pg/mL vs. -0.1±1.0pg/mL, p0.05, respectively) and TNF-alpha levels (-2.9±4.7pg/mL vs. 0.1±3.6pg/mL, p0.05, respectively) were significantly greater in the black raspberry group when compared to the placebo group. Increases in baFMD at 12-week follow-up were significantly greater in the black raspberry group when compared to the placebo group (3.3±4.4mm vs. 1.0±3.5mm, p0.05, respectively). Moreover, increases in circulating levels of CD34/CD133+ cells were significantly greater in the black raspberry group when compared to the placebo group (19±109/uL vs. -28±57/uL, p0.05, respectively).

Conclusions:
The use of black raspberry significantly decreased serum total cholesterol levels and inflammatory cytokines, and increased circulating levels of CD34/CD133+ cells, thereby improving vascular endothelial function in patients with metabolic syndrome during the 12-week follow-up.