A novel dietary supplement high in omega-3 fatty acids lowers blood pressure in individuals with type 2 diabetes

Background:

Type 2 Diabetes is on the rise. Data from NHANES III indicates that 71% of individuals with type 2 diabetes have elevated blood pressure (BP). In addition, approximately 75% of deaths in people with diabetes are related to cardiovascular disease (CVD). Management of traditional risk factors (TRF) may reduce but does not eliminate CVD events, indicating that TRF only partly explain the pathology of CVD in type 2 diabetes. Increasing evidence suggests that omega-3 fatty acids have beneficial effects on cardiovascular risk factors. The Lyon Diet Heart Study (LDHS) achieved a 65% decrease in CVD mortality when combining a plant source of omega-3 fats with a Mediterranean diet, despite no appreciable changes in TRF. Postulated mechanisms for the reduction in CVD mortality include changes in non-TRF, including inflammation, thrombosis, arrhythmias and the inhibition of atherosclerosis. Seeds from the plant source Salvia hispanica alba (*Salba™*) contain a high concentration of omega-3 fatty acids in addition to being a rich source of vegetable protein, fiber, calcium, iron, folate and antioxidants. This study examined whether the addition of Salba™ to the conventional treatment for diabetes is associated with improvement in TRF and non-TRF for CVD in people with Type 2 diabetes.

Methods:

In a randomized, single blind crossover design, 20 well controlled individuals with Type 2 diabetes (HbA_{1C}=6.8±0.9%; F=9; M=11; Age=64±8yrs; BMI=28±4kg/m^2) medically treated on a conventional diabetes diet (50:20:30%=CHO:PRO:FAT) received either addition of Salba™ or matched control supplement for 12 weeks separated by a 4-week washout period. Fasting blood samples and blood pressure (BP) measurements were taken at weeks 0 and 12.

Results:

After adjustments for age, sex, body weight and use of BP medications, the consumption of Salba™ was inversely associated with systolic blood pressure (SBP) with no significant differences in lipids or measures and mild glycemic control (HbA1C reduced across Salba™ treatment). SBP decreased by 9.6±11 mm Hg ($p<0.001$) in the Salba™ group. C-Reactive Protein, as marker of atherogenic low grade chronic body inflammation was significantly lower on the Salba™ diet compared to control (35%, $p<0.05$). Coagulation factors such as Von Wildebrand and Factor VIII improved significantly on the Salba™ diet compared to control (27%, $p=0.024$, 32%, $p=0.038$ respectively). Fibrinogen was decreased significantly from baseline on the Salba™ diet ($p<0.05$).

Conclusions:

We conclude that a seed high in omega-3 fatty acids and other nutrients may attenuate blood pressure and non-TRF, including body implamation and coagulation factors, for CVD in a high-risk population, thereby improving treatment of diabetes and CVD outcomes.

Introduction

Many studies have shown that diet can help prevent or may have a major implications in treatment of chronic disease. Omega-3 fatty acids specifically from fish oils have been shown to lower triglycerides, blood pressure and reduce cardiovascular disease mortality. α-linolenic acid, the plant source of omega-3 fatty acids, is a precursor to the longer chain polyunsaturated fatty acids found in fish oils.

The Lyon Diet Heart Study (LDHS) examined the effect of a typical Mediterranean diet combined with omega-3 fatty acids from plant origin and demonstrated a 65% reduction in cardiovascular disease mortality despite a lack of effect on lipids. This indicates that non traditional risk factors for heart disease such as markers of low grade chronic inflammation, coagulation and endothelial dysfunction may be of great importance.

Salba™ seed (*Salvia Hispanica alba*) is an ancient seed that was first cultivated by the Aztecs and is still consumed as a food and remedy in parts of Mexico and South America today. Because Salba™ has been shown in acute studies to affect after-meal blood glucose and insulin concentrations and is a high source of α-linolenic acid, vegetable protein, fiber and antioxidants, we investigated the effects of Salba™ seeds on measures of glycemic control and both traditional and non traditional risk factors for cardiovascular disease in people with Type 2 diabetes.

Conclusions

Overall:

Based on long term randomized clinical trial conducted at the Risk Factor Modification Center, St.Michael's Hospital, Faculty of Medicine, University of Toronto, Salba™ proves to be safe and efficacious adjunct to conventional treatment in individuals with type 2 diabetes, in reduction of traditional and non-traditional risk factors for CVD.

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Efficacy Parmeters:

1. The Salba™ diet significantly lowered systolic blood pressure compared to the control diet (9.6 mm Hg).
2. Coagulation factors were favorably altered. Fibrinogen significantly decreased on the Salba™ diet (30%). Factor VIII (32%) and Von Wildebrand Factor (35%) were both significantly lower than control at the end of the study.
3. C-Reactive Protein, a marker of low grade chronic inflammation, was significantly lower (40%) than control on the Salba™ diet at the end of the study.
4. There were no significant changes in bleeding time, liver function, or kidney parameters.
5. This data supports further study of the metabolic effects of Salba™ seed and its isolated components in people with diabetes.

Safety Parameters:

- No adverse effect or gastrointestinal side effect in 3 months Salba™ treatment. Glycemic control or blood lipids as previously reported by other authors being increased with high doses of omega-3 fatty acids, were not changed following long term consumption of Salba™.

References

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