Rodriguez-leyva D, Weighell W, Edel AL, et al. Potent antihypertensive action of dietary flaxseed in hypertensive patients. *Hypertension*. 2013;62(6):1081-1089.

Design

Prospective, double-blinded, placebo-controlled, randomized trial

Participants

All patients (110 in total) had peripheral artery disease (PAD). Baseline characteristics (body weight, waist circumference, and body mass index) were similar between the experimental group (*n*=58) and placebo group (*n*=52).

About three-quarters of the participants had high blood pressure; 80% were taking antihypertensive medications. By 6 months, 13 in the flaxseed group and 11 in the placebo group had dropped out of the study.

Study Medication and Dosage

Participants ate a variety of foods, including bagels, muffins, and buns, with added flaxseed totaling 30 g of milled flaxseed each day for 1 year. The placebo group ate similar foods but without the added flaxseed.

Outcome Measures

Plasma levels of α-linolenic acid and enterolignans were used as biomarkers of compliance. Body weight, systolic blood pressure (SBP), and diastolic blood pressure (DBP) were tracked.

Key Findings

Plasma levels of α-linolenic acid and enterolignans increased quickly so that at 1 month, fatty acids had doubled and lignans had increased tenfold in the flaxseed group; these increases persisted throughout the study.

Body weights did not differ between the groups at any time. After 6 months systolic blood pressure was ~10 mm Hg lower and diastolic ~7 mm Hg lower in the flaxseed group (*P*=0.04 for SBP and *P*=0.004 for DBP). Flax group participants who started with elevated blood pressure (>140 mm Hg) had more pronounced decreases in blood pressure—15 mm Hg in systolic and 7 mm Hg in diastolic. Levels of circulating α-linolenic acid levels were correlated with decreases in both systolic and diastolic blood pressure, while increased lignan levels were only correlated with changes in diastolic blood pressure. In the placebo group, systolic blood pressure increased by ~3 mm Hg and diastolic remained the same.

Practice Implications

These results come as a pleasant surprise. To quote the lead author, Dr. Delfin Rodriguez, "This reduction of SBP and DBP after administration of dietary flaxseed is the largest decrease in BP ever shown by any dietary intervention."

Flax receives so much attention for its role in oncology, decreasing breast cancer risk,1 and inhibiting cancer growth and metastasis,2 that other potential benefits are rarely on our radar.

Recent attention has focused on the ability of flaxseed to mitigate injury from radiation therapy.3 Flaxseed lignans in particular are often thought to act in a similar manner to tamoxifen against estrogen receptor (ER) positive breast cancers.4Evidence also suggests flax may inhibit Her-2 positive5 and ER-negative tumors.6

A 2013 review on flax and breast cancer concluded, "Current evidence suggests that flax may be associated with decreased risk of breast cancer. Flax demonstrates antiproliferative effects in breast tissue of women at risk of breast cancer and may protect against primary breast cancer. Mortality risk may also be reduced among those living with breast cancer."7

Flaxseed only appears to lower blood pressure in hypertensive individuals.

While several earlier animal studies have suggested that flaxseed might have an antihypertension action, this current paper may be the first human RCT that clearly demonstrates this effect.8,9 A 1997 trial of 15 obese individuals had reported that eating a margarine made of flax oil was associated with a “marked rise in arterial compliance [and] reflected rapid functional improvement in the systemic arterial circulation.”10 Still, the degree of improvement seen here is surprising.

It is interesting that the antihypertensive effect was selective: It only appears to lower blood pressure in hypertensive individuals. Such specificity is welcomed.

It is not surprising that a relatively high percentage [22% (24/110)] of participants dropped out of this study. Thirty grams of milled flax meal is just over an ounce dry weight, a sizable volume. Flaxseed, at least in constipated mice, was proven to be an effective laxative.11 It’s possible some participants may have found this effect intolerable.

While we await a longer trial to confirm these early improvements and tell us if long-term consumption reduces risk of cardiovascular incidents, we are already encouraging many of our patients with cancer, or a history of cancer, to consume flaxseed. Our experience suggests that patient compliance improves if we provide specific recipes for foods made with high volumes of flaxseeds—in particular cookies and muffins—similar to the foods these researchers chose. This recent Rodriguez study justifies the use of flaxseeds by a far larger proportion of our patients, in particular those with elevated blood pressure.

References

1.  Lowcock EC, Cotterchio M, Boucher BA. Consumption of flaxseed, a rich source of lignans, is associated with reduced breast cancer risk. *Cancer Causes Control*. 2013;24(4):813-816.
2.  Dabrosin C, Chen J, Wang L, Thompson LU. Flaxseed inhibits metastasis and decreases extracellular vascular endothelial growth factor in human breast cancer xenografts. *Cancer Lett*. 2002;185(1):31-37.
3.  Pietrofesa R, Turowski J, Tyagi S, et al. Radiation mitigating properties of the lignan component in flaxseed. *BMC Cancer*. 2013;13:179.
4.  Abrahamsson A, Morad V, Saarinen NM, Dabrosin C. Estradiol, tamoxifen, and flaxseed alter IL-1β and IL-1Ra levels in normal human breast tissue in vivo. *J Clin Endocrinol Metab*. 2012;97(11):E2044-E2054.
5.  Mason JK, Fu MH, Chen J, Yu Z, Thompson LU. Dietary flaxseed-trastuzumab interactive effects on the growth of HER2-overexpressing human breast tumors (BT-474). *Nutr Cancer*. 2013;65(3):451-459.
6.  Wang L, Chen J, Thompson LU. The inhibitory effect of flaxseed on the growth and metastasis of estrogen receptor negative human breast cancer xenograftsis attributed to both its lignan and oil components. *Int J Cancer*. 2005;116(5):793-798.
7.  Flower G, Fritz H, Balneaves LG, et al. Flax and Breast Cancer: A Systematic Review. *Integr Cancer Ther*. 2013 Sep 8. [Epub ahead of print].
8.  Park JB, Velasquez MT. Potential effects of lignan-enriched flaxseed powder on bodyweight, visceral fat, lipid profile, and blood pressure in rats. *Fitoterapia*. 2012;83(5):941-946.
9.  Prasad K. Flaxseed and cardiovascular health. *J Cardiovasc Pharmacol*. 2009;54(5):369-377.
10.  Nestel PJ, Pomeroy SE, Sasahara T, et al. Arterial compliance in obese subjects is improved with dietary plant n-3 fatty acid from flaxseed oil despite increased LDL oxidizability. *Arterioscler Thromb Vasc Biol*. 1997;17(6):1163-1170.
11.  Xu J, Zhou X, Chen C, et al. Laxative effects of partially defatted flaxseed meal on normal and experimental constipated mice. *BMC Complement Altern Med*. 2012;12:14.