

Pomegranate juice consumption for 3 years by patients with carotid artery stenosis reduces common carotid intima-media thickness, blood pressure and LDL oxidation

Clinical Nutrition

June 2004, 23, 423–433

Michael Aviram, Mira Rosenblat, Diana Gaitini, Samy Nitecki, Aaron Hoffman, Leslie Dornfeld, Nina Volkova, Dita Presser, Judith Attias, Harley Liker, Tony Hayek
FROM ABSTRACT

Dietary supplementation with polyphenolic antioxidants to animals was shown to be associated with inhibition of LDL oxidation and macrophage foam cell formation, and attenuation of atherosclerosis development.

We investigated the effects of pomegranate juice (which contains potent tannins and anthocyanins) consumption by atherosclerotic patients with carotid artery stenosis on the progression of carotid lesions and changes in oxidative stress and blood pressure.

Ten patients were supplemented with pomegranate juice for 1 year and five of them continued for up to 3 years. Blood samples were collected before treatment and during pomegranate juice consumption.

In the control group that did not consume pomegranate juice, common carotid intima-media thickness increased by 9% during 1 year, whereas, pomegranate juice consumption resulted in a significant intima-media thickness reduction, by up to 30%, after 1 year.

The patients' serum paraoxonase 1 (PON 1) activity was increased by 83%, whereas serum LDL basal oxidative state and LDL susceptibility to copper ion-induced oxidation were both significantly reduced, by 90% and 59%, respectively, after 12 months of pomegranate juice consumption.

Furthermore, serum levels of antibodies against oxidized LDL were decreased by 19%, and parallel serum total antioxidant status was increased by 130% after 1 year of pomegranate juice consumption.

Systolic blood pressure was reduced after 1 year of pomegranate juice consumption by 21%.

The results of the present study thus suggest that pomegranate juice consumption by patients with carotid artery stenosis decreases carotid intima-media thickness and systolic blood pressure and these effects could be related to the potent antioxidant characteristics of pomegranate juice polyphenols.

THESE AUTHORS ALSO NOTE:

Oxidative stress is a major contributor to cardiovascular diseases.

“Oxidized low density lipoprotein has been shown to be atherogenic and inhibition of LDL oxidation by potent dietary flavonoid antioxidants attenuated atherosclerosis development in laboratory animals.”

“The medicinal properties of pomegranate are described by all major religions and by folk medicine.”

“Pomegranate juice was indeed shown recently to possess impressive antioxidative properties due to its polyphenolics, tannins and anthocyanins.”

Ten patients consumed 50 ml [about 3 oz.] of pomegranate juice per day for a period of 1 year, and five of them agreed to continue for up to 3 years.

Pomegranates were picked by hand, washed, crushed, and squeezed. The juice was filtered, pasteurized, and concentrated.

RESULTS

The mean intima-media thickness of the left and right common carotid arteries from severe carotid artery stenosis patients that did not consume pomegranate juice, increased significantly, by 9%, during the 1 year period of this study.

In contrast, mean intima-media thickness in carotid artery stenosis patients that consumed pomegranate juice for up to 1 year was reduced as follows:

3 months	13%
6 months	22%
9 months	26%
12 months	35%

Pomegranate juice “administration to the patients substantially reduced their serum oxidative status, and could thus inhibit serum lipid peroxidation.”

“Pomegranate juice consumption resulted in a significant reduction in the levels of LDL associated lipid peroxides by up to 90% already after 6 months.”

“Serum PON1 activity increased after 1 year of pomegranate juice consumption by 73% and a further 10% increase was obtained after 3 years.”

“Serum lipid peroxidation that was decreased by 60% after 1 year of pomegranate juice consumption was further reduced by 16% after 3 years.”

"A substantial increase in the lesion glutathione (GSH) content, by 2.5-fold, was observed after pomegranate juice consumption for 3 or 12 months."

LDL oxidation by lesions derived from the patients after pomegranate juice consumption was significantly decreased compared to LDL oxidation rates obtained by lesions from carotid artery stenosis patients that did not consume pomegranate juice.

DISCUSSION

"The present study clearly demonstrates for the first time that pomegranate juice consumption by patients with carotid artery stenosis possesses anti-atherosclerotic properties as it significantly reduced common carotid intima-media thickness in association with a decrement in systolic blood pressure, and a substantial inhibition of lipids peroxidation in serum and in LDL."

"Pomegranate juice was used in our study as the antioxidant of choice, as it is very rich in polyphenols and demonstrates high capability to scavenge free radicals and to inhibit LDL oxidation in vitro and in vivo."

This study evaluated patients with very severe atherosclerosis.

"A reduction in oxidative stress was demonstrated already after 1 month of pomegranate consumption, (though it was much more pronounced with duration of pomegranate consumption)."

Substantial inhibitory effects of pomegranate consumption on carotid atherosclerosis were demonstrated after 9–12 months.

"This may indicate that if the anti-oxidant properties of pomegranate juice are responsible for the lesion size regression, then a long period of reduced oxidative stress is required."

"The ability of pomegranate juice to inhibit LDL oxidation could be related to the high potency of pomegranate juice major polyphenols (tannins and anthocyanins) to scavenge free radicals."

"Pomegranate juice contains very potent anti-oxidants."

Another anti-atherogenic effect of pomegranate juice consumption that leads to decreased intima-media thickness is its blood pressure lowering effect.

"In humans pomegranate juice consumption (by patients with carotid artery stenosis) possess anti-atherosclerotic properties, as it substantially decreased serum oxidative stress and, in parallel, reduced common carotid intima-media thickness."

KEY POINTS FROM DAN MURPHY

- 1) Intima-media thickness is a measure of arterial atherosclerotic stenosis. In patients with severe carotid artery stenosis, consumption of 3 oz. of pomegranate juice reduced intima-media thickness as follows:

3 months	13%
6 months	22%
9 months	26%
12 months	35%
- 2) In contrast, the control group that did not consume pomegranate juice, carotid intima-media thickness increased by 9% during 1 year.
- 3) Serum total antioxidant status was increased by 130% after 1 year of pomegranate juice consumption.
- 4) Systolic blood pressure was reduced after 1 year of pomegranate juice consumption by 21%.
- 5) Oxidative stress is a major contributor to cardiovascular diseases. "Oxidized low density lipoprotein is linked to atherosclerosis." Pomegranate juice "possesses impressive antioxidative properties due to its polyphenolics, tannins and anthocyanins."
- 6) Pomegranate juice "administration to the patients substantially reduced their serum oxidative status, and could thus inhibit serum lipid peroxidation."
- 7) "Pomegranate juice consumption resulted in a significant reduction in the levels of LDL associated lipid peroxides by up to 90% after 6 months."
- 8) "A substantial increase in the lesion glutathione (GSH) content, by 2.5-fold, was observed after pomegranate juice consumption for 3 or 12 months."
- 9) "The present study clearly demonstrates for the first time that pomegranate juice consumption by patients with carotid artery stenosis possesses anti-atherosclerotic properties as it significantly reduced common carotid intima-media thickness in association with a decrement in systolic blood pressure, and a substantial inhibition of lipids peroxidation in serum and in LDL."
- 10) "Pomegranate juice was used in our study as the antioxidant of choice, as it is very rich in polyphenols and demonstrates high capability to scavenge free radicals and to inhibit LDL oxidation in vitro and in vivo."
- 11) "A reduction in oxidative stress was demonstrated already after 1 month of pomegranate consumption, (though it was much more pronounced with duration of pomegranate consumption)."

- 12) Substantial inhibitory effects of pomegranate consumption on carotid atherosclerosis were demonstrated after 9–12 months.
- 13) “The ability of pomegranate juice to inhibit LDL oxidation could be related to the high potency of pomegranate juice major polyphenols (tannins and anthocyanins) to scavenge free radicals.”
- 14) “Pomegranate juice contains very potent anti-oxidants.”
- 15) Another anti-atherogenic effect of pomegranate juice consumption that leads to decreased intima-media thickness is its blood pressure lowering effect.
- 16) “In humans pomegranate juice consumption (by patients with carotid artery stenosis) possess anti-atherosclerotic properties, as it substantially decreased serum oxidative stress and, in parallel, reduced common carotid intima-media thickness.”
- 17) The results of the present study thus suggest that pomegranate juice consumption by patients with carotid artery stenosis decreases carotid intima-media thickness and systolic blood pressure and these effects could be related to the potent antioxidant characteristics of pomegranate juice polyphenols.

COMMENT FROM DAN MURPHY

Our family, and many friends, colleagues, and patients consume a daily nutrient shake. The juice we use in the shake is pomegranate juice.

Every Day, All People
Nutri-West (800-443-3333)

- 1) Take a multivitamin / mineral supplement:

Core Level Health Reserve 3 per day

- 2) Mitochondrial Health:
 - A) Acetyl-L-carnitine
 - B) Alpha-lipoic acid
 - C) CoQ 10

Complete AG 3 per day

- 3) Increase Glutathione
 - A) N-Acetyl Cysteine, or NAC: **Complete Glutathione** 2 - 4 per day
 - B) Undenatured Whey Protein: **Complete Whey-G** 2 scoops per day

- 4) Take omega-3s: **Complete Omega-3 Essentials capsules**
3 g / day = 6 capsules per day

OR

Complete Hi-Potency Omega-3 liquid
1 teaspoon per day

- 5) Take omega-3 antioxidants **Complete Omega-3 Co-Factor** 3 per day

- 6) Take 800 IU vitamin D3 per day **Vitamin D 400** 2 per day

New Antioxidant Shake; put into a blender:

- 3 Core Level Health Reserve
- 3 Complete AG
- 2 - 4 Complete Glutathione
- 3 Complete Omega-3 Co-Factors
- 2 Vitamin D 400
- 1 cup of mixed frozen blueberries
- 3/4 cup of pomegranate juice + 1/4 cup orange juice

Blend

After blending add two scoops of **Complete Whey-G** and mix in with a fork (do **Not** blend). Consume all at once or divide it into thirds to consume throughout day, keep refrigerated. Take Omega-3s separate, preferably at the end of the day.