

# Hawthorn: The Three-in-One Natural Remedy for High Blood Pressure

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High blood pressure affects approximately 25 percent of the adult population in developed countries such as the United States and Canada. In up to 75 percent of these cases, hypertension manifests in a mild form that is highly sensitive to nutrition, supplementation and lifestyle practices. Hawthorn has been prescribed by European doctors for years to treat various heart conditions including hypertension, ischemic heart disease (angina) and congestive heart failure.

Hawthorn's cardiovascular benefits are primarily due to the unique complement of flavonoid compounds found in its leaves, berries and blossoms, particularly anthocyanidins and proanthocyanidins. These active constituents help reduce high blood pressure, and clinical studies have proven that supplementation with hawthorn extract can be a safe, natural method to treat mild to moderate hypertension. Hawthorn has been shown to provide three distinctive physiological effects [ACE inhibition, calcium-channel blocking, and nitric oxide release (vasodilator)], each of which contributes to its anti-hypertensive properties.

## ACE Inhibitors

ACE inhibitors are agents that block the conversion of angiotensin I to angiotensin II, thereby reducing high blood pressure. Under normal conditions, the angiotensin system is activated in response to hypotension, decreased sodium concentration in the distal tubule, decreased blood volume and/or renal sympathetic-nerve stimulation. In response, the kidneys release renin, which cleaves the liver-derived angiotensinogen into angiotensin I, which is then converted to angiotensin II via the angiotensin-converting enzymes (ACE) in the pulmonary circulation, as well as in the endothelium of blood vessels in many parts of the body. The system, in general, aims to increase blood pressure.

Angiotensin II constricts arteries and veins and increases blood pressure. Angiotensin II also has prothrombotic potential through adhesion and aggregation of platelets and production of PAI-1 and PAI-2 (plasminogen activator inhibitor), which decreases fibrinolysis. It potentiates the release of norepinephrine by direct action on postganglionic sympathetic fibers. It increases sodium resorption in the proximal tubules of the kidney.

All of these effects increase blood pressure and can increase risk of thrombosis and hypertension in a state of dysregulation. With ACE inhibitors, the effects of angiotensin II are prevented, leading to decreased blood pressure (by inhibiting the enzyme that converts angiotensin I into angiotensin II) and decreased platelet adhesion.

ACE inhibitors are also the drug of choice in the management of diabetes to retard progress of diabetic nephropathy. Although many prescription drugs are prescribed for their ACE-inhibitor properties, hawthorn extract has been shown to lower blood pressure by acting as a natural ACE

inhibitor in cases of mild to moderate hypertension.

### Calcium-Channel Blockers

Calcium-channel blockers work by blocking voltage-gated calcium channels (VGCCs) in muscle cells of the heart and blood vessels. This prevents calcium levels from increasing as much in the cells when stimulated, leading to less muscle contraction. In the heart, this decreases cardiac contractility (systolic pressure). In blood vessels, a decrease in calcium results in less contraction of the vascular smooth muscle and therefore an increase in vasodilation (diastolic pressure). Vasodilation decreases total peripheral resistance, while a decrease in cardiac contractility decreases cardiac output. These effects lower diastolic and systolic blood pressure. Although many anti-hypertensive prescription drugs act as calcium-channel blockers, studies have shown that the active constituents in hawthorn can help to lower mild to moderate hypertension via their natural calcium-channel-blocker properties.

### Nitric Oxide Release (Vasodilation)

Under normal conditions, the endothelial cells that line our blood vessels secrete nitric oxide, which dilates the vessels in accordance with the oxygen required by the tissues supplied by those vessels. In atherosclerosis and under certain other conditions (cigarette smoking, high cholesterol, lack of antioxidant or folic-acid status), individuals experience endothelial dysfunction, whereby the arterioles remain in a relative state of vasoconstriction. In turn, this reduces blood flow to the tissues supplied by these vessels, which can exacerbate angina, ischemic heart disease and hypertension.

In addition to dietary modification, exercise and medication use to modify endothelial dysfunction, hawthorn extract has shown an ability to increase release of nitric oxide and promote vasodilation. This is another way in which hawthorn extract may reduce high blood pressure and promote improved circulation to the heart muscle.

In addition, hawthorn extract has a proven positive inotropic effect on the heart muscle (similar to coenzyme Q10), enabling the heart muscle to generate more ATP energy for myocardial contraction. This is why it remains a key intervention among European physicians for managing congestive heart failure and hypertension.

### Hawthorn Dosage in Hypertension

In cases of mild to moderate high blood pressure, you may consider recommending 150-300 mg per day of hawthorn extract (standardized to contain 3 percent to 5 percent flavonoid content). I usually recommend a combination supplement product containing CoQ10 and hawthorn, as both lower blood pressure, improve endothelial function and have a positive inotropic effect on the heart muscle. Each capsule of the combination supplement I recommend contains CoQ10 (30 mg), hawthorn extract (37.5 mg, standardized to 5 percent flavonoids) and quercetin (50 mg), which has been associated with lower cardiovascular risk in some studies.

I recommend that the patient take two capsules, two to four times per day, depending on the degree of hypertension, comorbidity issues and other factors (fitness level, smoking status, etc.). I often start with a lower dose (two capsules, twice per day) and increase weekly if necessary, depending on the patient's response to treatment.

Note that the patient can take a supplement combination of this type in association with any other

anti-hypertensive drug prescribed by their physician. However, hawthorn is not safe to take in conjunction with digitalis or digoxin, which are prescribed in some cases of congestive heart failure and arrhythmias. You should also make the patient aware of other lifestyle practices that help to reduce high blood pressure.

Scientific and clinical investigations have shown that active constituents in hawthorn extract can reduce high blood pressure via their influence on the angiotensin system, acting as calcium-channel blockers and improving endothelial function. When taken with CoQ10 and in conjunction with other anti-hypertensive lifestyle measures, hawthorn supplementation is a key element in the natural management of mild to moderate high blood pressure. In North America, hawthorn is often overlooked in this regard. As such, natural health practitioners should bring this information to the attention of their hypertensive patients to enhance management of their condition, and reduce their dependency on other medications that may carry a greater risk of untoward side effects.

### Resources

- Halpern S, Ed. *Quick Reference to Clinical Nutrition: A Guide for Physicians*. Philadelphia: J.B. Lippincott Company, 1987:139-53.
- *Canadian Guidelines for Cardiac Rehabilitation and Cardiovascular Disease Prevention, First Edition*. Winnipeg, Manitoba: Canadian Association of Cardiac Rehabilitation, 1999;94-104.
- Tyler VE. *Herbs of Choice: The Therapeutic Use of Phytomedicines*. New York: Routledge.
- Petkov V. *Plants with hypotensive, anti-atheromatous and coronarodilating action*. Am Chin Med 1979;7:197-236.
- Uchida S, Ikari N, Ohta H, et al. *Inhibitory effects of condensed tannins on angiotensin converting enzyme*. Jpn J Pharmacol 1987;42:242-5.
- Brown DJ. *Herbal Prescriptions for Better Health*. Rocklin, Calif.: Prima Publishing, 1996.
- Newall CA, Anderson LA, Phillipson JD. *Herbal Medicines: A Guide for Health Care Professionals*. London: The Pharmaceutical Press, 1996.
- Kuhnau J. *The flavonoids: a class of semi-essential food components*. Their role in human nutrition. World Rev Nutr Diet 1976;24:117-91.
- Middleton E. The flavonoids. *Trends Pharm Sci* 1984;5:335-8.
- Ammon HPT, Handel M. *Crataegus: toxicology and pharmacology*. *Planta Medica* 1981;43:318-22.
- Tauchert M, Ploch M, Hubner WD. *Effectiveness of hawthorn extract LI 132 compared with the ACE inhibitor Captopril: multicenter double blind study with 132 NYHA Stage II*. *Muench Med Wochenschr* 1994;136 suppl:S27-33.
- Kim SH, Kang KW, Kim KW, Kim ND. *Procyanidins in crataegus extract evoke endothelium-dependent vasorelaxation in rat aorta*. *Life Sci* 2000;67(2):121-31.
- Edmunds MW, Mayhew MS, Eds. *Pharmacology for the Primary Care Provider*. St. Louis: Mosby.

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