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WINTER 2020



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New Approaches to Managing Hypertension Using Central Blood Pressure Measurement and Supplements

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Many patients diagnosed with high blood pressure may think they have it under control but are still at risk of arterial and organ damage because of elevated blood pressure levels. According to a study at the Baylor College of Medicine, only 27% of Americans who have high blood pressure are able to keep it at levels lower than 140/90 mmHg⁽¹⁾ which is still much higher than the 120/80 mmHg level recommended for optimal health.

In fact, the most recent data from the National Health and Nutrition Examination Survey (NHANES), has found that control rates among Americans with hypertension declined approximately 10% to around 44% from the peak a few years earlier.⁽²⁾ This decline is especially alarming in light of the fact that hypertension has been identified as an important factor tied to more serious consequences from COVID-19.

Patients may believe that because they are taking antihypertensive medication, they do not need to worry about having a cardiovascular event, but medication adherence is just one piece of the puzzle. Reining in high blood pressure takes more than a one-shot approach because it is multifaceted condition. Drugs may not be enough for some, while for others might not necessary at all.

A customized approach that combines medication, diet and nutrition, stress management, and lifestyle modifications work best to control hypertension. This can also include nutritional supplements that support arterial health and advanced diagnostic tools and screening methods that go beyond the standard brachial cuff such as central blood pressure measurement which provide clinicians additional data to personalize treatment plans.

HIGH BLOOD PRESSURE AND ENDOTHELIAL DYSFUNCTION: A LETHAL MATCH



One of the key factors to consider in the regulation of blood pressure is the integrity and tone of the blood vessels through which the blood flows. Namely, the endothelial cells that line the inside walls of your blood vessels. These cells have a critical role in the regulation of blood pressure and blood flow because they release substances that contribute to the relaxation and contraction of vascular smooth muscle. Other factors that impact blood vessel tone include stress, medications, numerous diseases, and diet.⁽³⁾

In health individuals, the body naturally provides a balance between the substances that relax and contract the lining of your blood vessels. The introduction of high blood pressure, however, changes that balance which increases the risk of vascular disease.

At the same time, the endothelial dysfunction can arise if the endothelial cells cannot respond to the demands for greater blood flow by widening or dilating the vessels. Endothelial dysfunction is a primary player in the development of hardening of the arteries, aka atherosclerosis.

Therefore, there are two scenarios that are important here. One, you need to help support and promote endothelial function as a way to reduce the risk of stroke, heart attack,

and cardiovascular death associated with hypertension.
(4) Two, you should focus on maintaining a healthy blood pressure to ensure the integrity of your endothelial cells.

ENHANCING STANDARD TREATMENTS WITH SUPPLEMENTS

Most people are familiar with the standard treatments for hypertension, which include lifestyle changes - avoiding salt, losing excess weight, not smoking, regular exercise - combined with prescription medications. Drugs such as diuretics, beta-blockers, angiotensin-converting enzyme inhibitors, angiotensin II receptor antagonists, and calcium channel blockers are commonly prescribed. Physicians may also order alpha-blockers, alpha-beta blockers, aldosterone antagonists, central-acting agents, and vasodilators. Natural supplements can also be helpful in managing blood pressure, in particular the following substances:

Grape seed extract - Grapeseed extract is obtained from the pulverized seeds of red wine grapes. Numerous studies have shown that this extract has an ability to improve poor circulation as well as tackle high cholesterol, two factors involved in hypertension. The power of grape seed extract comes from its high content of polyphenols, which are potent antioxidants with an ability to increase the dilation of blood vessels.⁽⁵⁾

One study, a 2016 meta-analysis of the use of grape seed

extract in patients with hypertension, analyzed data from 16 clinical trials and 810 subjects. The reviewers found that grape seed extract was associated with a significant decline in both systolic and diastolic blood pressures. The impact was more notable among individuals younger than 50 and those who were obese, as well as anyone with metabolic disorders.⁽⁶⁾

Another benefit of grape seed extract is an ability to help improve endothelial function. The results of a laboratory study showed that the extract was able to inhibit the production of a protein associated with endothelial dysfunction and death.⁽⁷⁾

Grape seed extract also can protect against another cardiovascular disease risk: oxidation of low-density lipoprotein (LDL). After eating, elevated levels of lipids (fats, oils, steroids) increase the risk for heart disease in part because they are highly susceptible to oxidation. Research has shown that when individuals consumed grape seed extract along with a meal, the LDL particles were better able to resist oxidative changes. This suggested to investigators that grape seed extract could reduce cardiovascular risk.⁽⁸⁾

The suggested dose of grape seed extract is between 100 and 300 mg/day. This is the amount that has been used in studies and is being prescribed in some countries in Europe.⁽⁶⁾

Coenzyme Q10 - The potent antioxidant coenzyme Q10 (CoQ10; aka, ubiquinone) is known for its ability to help cells produce energy. However, researchers have also demonstrated



how it can lower both systolic and diastolic blood pressures.

In a meta-analysis involving 12 clinical trials and 362 patients, use of coenzyme Q10 was shown to reduce systolic blood pressure by up to 17 mmHg and diastolic pressure by up to 10 mmHg without any significant side effects.⁽⁹⁾ In a more recent (2018) review involving 17 trials and 684 patients, use of coenzyme Q10 significantly lowered systolic but not diastolic pressure.⁽¹⁰⁾ A typical dose of CoQ10 is 100 to 200 mg daily, but higher doses have been used in research.

Pomegranate extract and juice – Both pomegranate (*Punica granatum* L) extract and juice have demonstrated an ability to help support cardiovascular health, and high blood pressure in particular.⁽¹¹⁾ Pomegranates are especially high in numerous phytonutrients, including punicalagins, the main antioxidant found in the fruit and one that is unique to pomegranates.⁽¹²⁾ In fact, this is the phytonutrient emphasized in quality supplements because it is believed to provide the greatest health benefits. The results of a recent review and meta-analysis showed evidence of these benefits. The research was limited to pomegranate juice, which lowered systolic pressure by a mean of about 5 mmHg and diastolic pressure by 2 mmHg. The authors of the study concluded that “this evidence suggests it may be prudent to include this fruit juice in a heart-healthy diet.”⁽¹³⁾

What about pomegranate extract? In a 2017 article appearing in the *Journal of Nutritional Science*, 55 subjects were given either a pomegranate extract or placebo daily for eight weeks. At the end of the trial, there was a significant decrease in diastolic blood pressure, but not in systolic pressure.⁽¹⁴⁾

ADDITIONAL SCREENING TO SUPPORT TREATMENT

Uncontrolled hypertension can directly result in end-organ failure, including kidney failure, heart failure, and other deadly conditions. Although guidelines indicate the need to evaluate patients with hypertension for such organ failure, methods to assess subclinical vascular damage (i.e., blood vessel and other associated damage that is not yet readily noticeable) are not universally incorporated into clinical practice.

The definition of optimal blood pressure has been changing over the past few decades. The Joint National Committee of the US Department of Health and Human Services had defined 120/80 mmHg as optimal for lowering the risk

of experiencing cardiovascular events⁽¹⁵⁾ but also added readings of 120-139/80-89 mmHg as “prehypertension.”⁽¹⁶⁾

However, in 2006, researchers determined that blood pressures of 120-129/80-84 mmHg were associated with an 81% higher risk of coronary heart disease, ischemic stroke, and other cardiovascular diseases when compared to optimal blood pressure of less than 120/80 mmHg. The experts also noted that blood pressure levels of 130-139/85-89 mmHg were associated with a 133% greater risk of cardiovascular events.⁽¹⁷⁾

In 2017, the American College of Cardiology and the American Heart Association provided new guidelines, stating that stage 1 hypertension was defined as greater than or equal to 130/80 mmHg. An increase of systolic pressure by 20 mmHg and of diastolic by 10 mmHg doubles a person's risk of dying from stroke and other cardiovascular diseases.⁽¹⁸⁾

These changing guidelines highlight the need for greater adoption and use of accurate and comprehensive hemodynamic assessment tools. Clinicians may wonder which blood pressure is optimal to measure, brachial or central blood pressure (cBP) but both should be used to get a more complete picture of the patient's arterial health.

Clinicians are most familiar with brachial systolic pressure which measures the pressure or force of blood as it pushes against the walls of blood vessels using an arm-cuff device, but central blood pressure pulse wave analysis can help individualize hypertension management and better targeted drug selection.

Central systolic blood pressure – the measurement of the pressure in the aorta – can be measured using one of several methods. A noninvasive way to take central systolic blood pressure is to use a tonometer, a small device that is placed on the skin over the brachial artery in the arm to measure the pulse. Another approach involves using a conventional blood pressure cuff that is attached to a specialized device that reads pulse waveforms.

Central systolic blood pressure is believed to present a more accurate assessment of an individual's risk of a cardiovascular event or organ damage if left untreated because of its proximity to key organs. It is important to understand that central systolic blood pressure can be significantly different from brachial systolic readings and that medications can affect brachial and central systolic blood pressures differently. Research indicates that central

blood pressure is more strongly related to end-organ damage than is brachial blood pressure, which suggests central blood pressure is the reading clinicians should be measuring to help them improve management of hypertension.⁽¹⁹⁻²⁴⁾

THE BOTTOM LINE

Hypertension and arterial stiffness should not be taken lightly. Lifestyle modifications like diet, exercise, stress management, and in addition to supplemental nutrients may help patients control hypertension and maintain good health as they age. But given the lack of symptoms, it is critical to understand an individual's risk through central blood pressure measurement as well as standard brachial blood pressure. If we really want to prevent or reduce hypertension and its complications we need better screening for secondary hypertension, new ways to assess flow dynamics, and

evaluation of left ventricular hypertrophy and geometry and arterial pressure waveforms and more efficient ways to refine hypertension management decisions and prevent morbidity and mortality associated with high blood pressure.

Craig Cooper is CEO and Managing Director of both CardieX and ATCOR, global health technology companies focused on hypertension, cardiovascular disease, and other vascular health disorders.

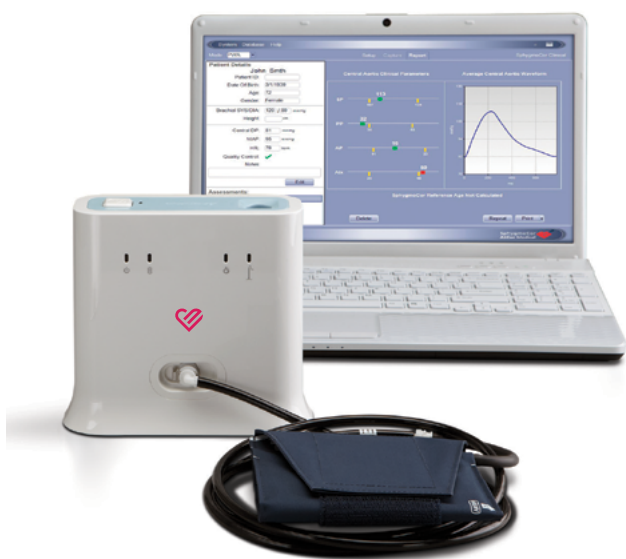
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PERSONALIZED AND PRECISE BLOOD PRESSURE MANAGEMENT.

The health hazards of high blood pressure are well understood — **elevated risk of heart attack, stroke, and kidney damage**, as well as arterial disease, erectile dysfunction, and dementia.

But chronic hypertension **can also cause premature aging** — with a wide range of cardiovascular, cognitive, and cosmetic complications.



ATCOR is the gold standard for assessing noninvasive central blood pressure (NcBP) and arterial stiffness, the primary cause of age-related hypertension.

The standard brachial blood pressure test does not measure blood pressure where it really matters—at target organs like the brain, kidneys, and the heart itself. For that you need central blood pressure.

Central blood pressure is the most reliable indicator of cardiovascular risk and the most reliable guide for precise, personalized blood pressure management.

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