

HIGH BLOOD PRESSURE GUIDE

HIGH BLOOD PRESSURE INTRODUCTION
PRESENTED BY **ALISTROL HEALTH**

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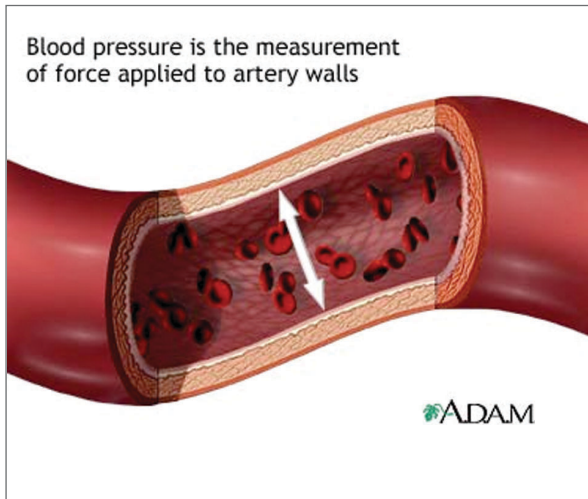
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HIGH BLOOD PRESSURE INTRODUCTION

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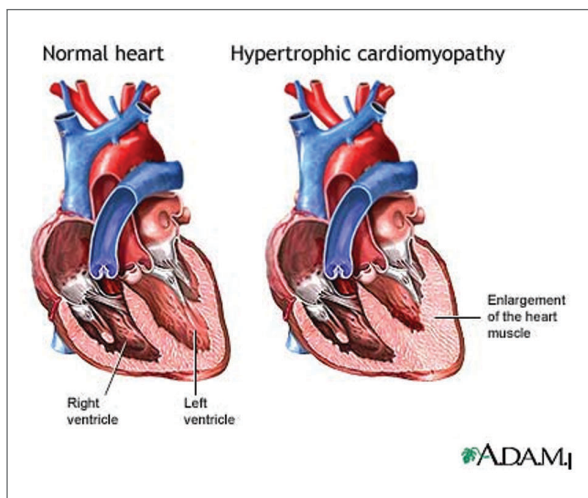
High blood pressure, also called hypertension, is elevated pressure of the blood in the arteries. Hypertension results from two major factors, which can be present independently or together:

- " The heart pumps blood with excessive force
- " The body's smaller blood vessels (known as the arterioles) narrow, so that blood flow exerts more pressure against the vessels' walls



Blood pressure is the force applied against the walls of the arteries as the heart pumps blood through the body. The pressure is determined by the force and amount of blood pumped and the size and flexibility of the arteries.

HYPERTROPHIC CARDIOMYOPATHY



Hypertrophic cardiomyopathy is the thickening of the muscles that make up the heart. The thickening may interfere with the normal functioning of the heart by: narrowing the outflow of the ventricle reducing the ability of the heart to relax and fill with blood during the relaxation phase reducing the ability of the valves of the heart to function properly Any situation that increases the contraction or rate of contraction of the heart muscle can worsen these symptoms.

Review Date: 09/27/2005

Reviewed By: H. Jacqueline Suk, M.D., Department of Cardiology, Brigham and Women's Hospital, Boston, MA. Review provided by VeriMed Healthcare Network.

Such pressure can also injure blood vessels in the heart, kidneys, the brain, and the eyes.

Two numbers are used to describe blood pressure: the systolic pressure (the higher and first number) and the diastolic pressure (the lower and second number). Health dangers from blood pressure may vary among different age groups and depending on whether systolic or diastolic pressure (or both) is elevated. A third measurement, pulse pressure, may also be important as an indicator of severity. Blood pressure is measured in millimeters of mercury (mm Hg). According to current adult guidelines, blood pressure is categorized as normal, prehypertensive, and hypertensive (which is further divided into Stage 1 and 2, according to severity). People in normal health should have a blood pressure reading of 120/80 mm Hg or less. High blood pressure is generally considered to be a blood pressure reading greater than or equal to 140 mm Hg (systolic) or greater than or equal to 90 mm Hg (diastolic). Blood pressure readings in the prehypertension category (120-139 systolic or 80-89 diastolic) indicate an increased risk for developing hypertension.

Current guidelines for children are based on percentile ranges for a child's body size. Hypertension is defined as average systolic and diastolic readings that are greater than the 95th percentile for gender, age, and height on at least three occasions. Prehypertension in children is diagnosed when average systolic or diastolic blood pressure levels are at least in the 90th percentile but less than the 95th percentile. For adolescents, as with adults, blood pressure readings greater than 120/80 are considered prehypertensive. Increasing rates of childhood obesity have lead to higher than average blood pressure levels in children.

American expert groups recommend treating any blood pressure above normal. Some experts are concerned,

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however, that such guidelines may unnecessarily increase the use of anti-hypertensive drugs. It is important that patients establish a relationship with a doctor whom they trust, to help them determine individual blood pressure goals and treatment regimens. For some patients, a decrease of a few points in blood pressure may not be worth the side effects caused by higher doses of anti-hypertensive drugs.

Systolic Blood Pressure. The systolic pressure (the first and higher number) is the force that blood exerts on the artery walls as the heart contracts to pump out the blood. High systolic pressure is now known to be a greater risk factor than diastolic pressure for heart, kidney, and circulatory complications and for death, particularly in middle-aged and elderly adults. The wider the spread between the systolic and diastolic measurements, the greater the danger.

Elevated systolic pressure may pose a significant danger for heart events and stroke events even when diastolic is normal -- a condition called isolated systolic hypertension. Isolated systolic hypertension is the most common form of hypertension in people older than age 50. In one study, it comprised 87% of hypertension cases in people between ages 50 and 59.

Diastolic Blood Pressure. The diastolic pressure (the second and lower number) is the measurement of force as the heart relaxes to allow the blood to flow into the heart. High diastolic pressure is a strong predictor of heart attack and stroke in young adults.

Pulse Pressure. Pulse pressure is the difference between the systolic and the diastolic readings. It appears to be an indicator of stiffness and inflammation in the blood-vessel walls. The greater the difference between systolic and diastolic numbers, the stiffer and more injured the vessels are thought to be. Although not yet used by doctors to determine treatment, evidence suggests that it may prove to be a strong predictor of heart problems, particularly in older adults. Some studies suggest that in people over 45 years old, every 10 mm Hg increase in pulse pressure increases the risk for stroke rises by 11%, cardiovascular disease by 10%, and overall mortality by 16%. (In younger adults the risks are even higher.)

HYPERTENSION CATEGORIES

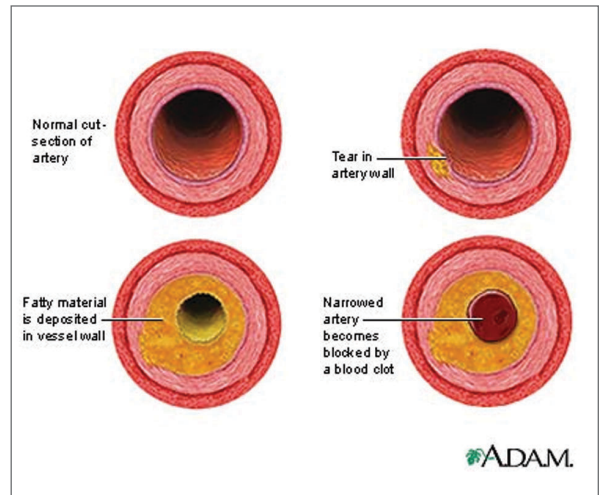
Some experts categorize hypertension into the following types:

Essential Hypertension. Essential hypertension is also known as primary or idiopathic hypertension. About 90% of all high blood pressure cases are this type. The causes of essential hypertension are unknown but are based on complex processes in all major organs and systems, including the heart, blood vessels, nerves, hormones, and the kidneys.

Secondary Hypertension. Secondary hypertension comprises about 5% of high blood pressure cases. In this condition, the cause has been identified.

Isolated Systolic Hypertension. This occurs when systolic hypertension is over 140 mm Hg but diastolic pressure is normal. It is related to arteriosclerosis (hardening of the arteries).

DEVELOPMENTAL PROCESS OF ATHEROSCLEROSIS



The development of arterial atherosclerosis may occur when deposits of cholesterol and plaque accumulate at a tear in the inner lining of an artery. As the deposits harden and occlude the arterial lumen, blood flow to distant tissues decreases and a clot may become lodged, completely blocking the artery.

Review Date: 10/11/2005

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Diagnosis

Most physical exams include a blood pressure measurement. Patients should not smoke or drink caffeinated beverages within 30 minutes before their blood pressure measurement.

The Sphygmomanometer

- The standard instrument used to measure blood pressure is called a mercury sphygmomanometer. Measurements are given as units of mercury, which has filled the central column in standard sphygmomanometers for years. (Some people view the mercury sphygmomanometer as an environmental health hazard, but modern devices are designed to prevent mercury spillage.)

- An inflatable cuff with a meter attached is placed around the patient's arm over the artery while the patient is seated. The inflated cuff briefly interrupts the flow of blood in the artery, which then resumes as the cuff is slowly deflated.

- The person taking the blood pressure listens through a stethoscope for so-called Korotkoff sounds, which first appear as blood begins to flow through the artery and then change in tone and volume as the cuff is deflated.

- If a first blood pressure reading is above normal, the health professional may take two or more measurements separated by 2 minutes with the patient sitting or lying down. Another measurement may be taken after the patient has been standing for 2 minutes.

To measure blood pressure, your doctor uses an instrument called a "sphygmomanometer," more often referred to as a blood pressure cuff. The cuff is wrapped around your upper arm and inflated to stop the flow of blood in your artery. As the cuff is slowly deflated, your doctor uses a stethoscope to listen to the blood pumping through the artery. These pumping sounds register on a gauge attached to the cuff. The first pumping sound your doctor hears is recorded as the systolic pressure, and the last sound is the diastolic pressure.

Although this test has been used for more than 90 years, it is not completely accurate or sensitive. The following factors can cause a falsely low pressure reading:

- An arm cuff that is too wide
- Recent exercise
- Not smoking for a while after heavy, long-term smoking

Falsely high pressure can result from:

- An arm cuff that is too small
- Talking during the test
- Recently consuming foods or beverages (such as coffee) that raise blood pressure

Office blood pressure readings taken by a doctor are more likely to be higher than readings measured at home. This so-called white-coat hypertension requires additional readings by a nurse or by the patient. Home monitoring improves the accuracy of a simple office measurement. An average of all the measurements will be considered in the diagnosis of hypertension. If high normal or high blood pressure persists, further tests should be performed to determine if the organs are affected.

Other Blood-Pressure Monitors. Alternative pressure-measuring aneroid and electronic devices are available. Aneroid instruments are round, compass-like devices that use a metal spring to measure blood pressure and are often used by doctors. Electronic devices are typically used for home monitoring.

HOME MONITORING

Monitoring Equipment. A number of home tests are available for checking blood pressure between doctor visits. A doctor may loan a patient a portable unit that records blood pressure during a full day's activity. This test, known as ambulatory monitoring, is particularly useful for those who experience wide blood pressure swings, such as those who have white-coat hypertension or show resistance to drug therapy. According to one study, accurately measuring blood pressure at home over a full day was a significantly better predictor of cardiovascular risk than standard office-based measurements. To improve clinical outcomes, devices are now available that allow 24-hour ambulatory blood pressure monitoring and electronically store results for analysis by the doctor. It is not clear if their added benefits justify their expense, however.

Cuffs and Stethoscopes. Manual cuffs and stethoscopes are fairly accurate, but they require practice to use. The cuff must be the right size (one size does not fit all). Devices that use a digital readout and a cuff that can be electronically inflated and deflated are proving to be as accurate as a stethoscope.

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Blood Pressure Variations at Home. In general, everyone's **blood pressure varies in the same way throughout a given day. In monitoring at home, it is important to note these changes:**

- Blood pressure is usually highest at work.
- It drops slightly at home.
- It then normally dips to its lowest level during sleep.

There are important exceptions. Certain people have a condition called nondipper hypertension, in which blood pressure does not fall at night. Postmenopausal women appear to be at particular risk for this phenomenon, and it may pose a special danger for heart disease and stroke (particularly in older African American women). It has also been linked to salt-sensitivity and insulin resistance.

Causes

Hypertension is referred to as essential (primary) when the doctor is unable to identify a specific cause. It is by far the most common type of high blood pressure. The causes of this type are unknown but are likely to be a complex combination of genetic, environmental, and other factors. Genetic Factors. A number of genetic factors or interactions between genes play a major role in essential hypertension. Experts think that the chromosomes (13 and 18) house the genes responsible for blood pressure regulation, although pinning down the range of specific genes involved in hypertension is more difficult.

Abnormalities in the Angiotensin-Renin-Aldosterone System. Genes under intense study are those that regulate a group of hormones known collectively as the angiotensin-renin-aldosterone system. This system influences all aspects of blood pressure control, including blood vessel contraction, sodium and water balance, and cell development in the heart.

Experts believed that this system evolved millions of years ago to protect early humans during drought or stress by retaining salt and water and narrowing blood vessels to ensure adequate blood flow and repair injured tissue. With industrialization, however, this system wreaks havoc on modern humans by intensifying the effects of high-salt diets and sedentary lifestyle. Of particular importance in these harmful responses are the hormone aldosterone and a peptide (which are components of proteins) called angiotensin II.

Inherited Abnormalities in the Sympathetic Nervous System.

Studies suggest that some people with essential hypertension may inherit abnormalities of the sympathetic nervous system. This is the part of the autonomic nervous system that controls heart rate, blood pressure, and the diameter of the blood vessels.

Insulin Resistance and Type 2 Diabetes. Hypertension is strongly associated with diabetes, both type 1 and type 2. Kidney damage is generally the cause of high blood pressure in type 1 diabetes. Obesity and insulin resistance are the factors associated with hypertension in type 2 diabetes, the more common type. People with type 2 diabetes generally have normal or high levels of insulin, a critical hormone in the metabolism of sugar. However, they are unable to use the insulin, the condition called insulin resistance. Without insulin, blood glucose (sugar) levels rise, the hallmark of diabetes.

Some research indicates that obesity is the one common element linking insulin, type 2 diabetes, and high blood pressure. Obesity is common in both type 2 diabetes and hypertension. Oddly, however, studies have found a stronger association between hypertension and insulin resistance in thin patients as well as overweight people with type 2 diabetes. Some research indicates that insulin resistance may cause sodium retention, a contributor to high blood pressure.

In any case, regardless of the causal connections, people who have both insulin resistance or full-blown diabetes plus hypertension have a significantly greater chance for heart attack, kidney disease, and stroke than people who have only high blood pressure.

Obesity. Obesity on its own has a number of possible effects that could lead to hypertension. It may blunt certain actions of insulin that open blood vessels, and it may cause structural changes in the kidney and abnormal handling of sodium. It is also associated with alterations in the systems that regulate blood flow.

Low Levels of Nitric Oxide. The gas nitric oxide can be produced in the body, where it affects the smooth muscles cells that line blood vessels; it helps keep them relaxed, flexible. It may also help prevent blood clotting. Low levels of nitric oxide have been observed in people with high blood pressure (particularly in African Americans) and may be an important factor in essential hypertension.

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Secondary Hypertension

Secondary hypertension has recognizable causes, which are usually treatable or reversible.

Medical Conditions. A number of medical conditions can cause secondary high blood pressure:

- Kidney disease is the most common cause of secondary hypertension, particularly in older people.
- Sleep apnea, a disorder in which breathing halts briefly but repeatedly during sleep, is now highly associated with hypertension. A weak but still higher than normal association with high blood pressure has even been observed in those who snore or have mild sleep apnea. The relationship between sleep apnea and hypertension has been thought to be largely due to obesity, but major studies are finding a higher rate of hypertension in people with sleep apnea regardless of their weight. Treating sleep apnea with a device known as nasal continuous positive airway pressure (CPAP) may have modest benefits blood pressure as well.

Risk Factors

During the last decade, the number of Americans with high blood pressure has increased by 30 percent. Over 65 million American adults now have high blood pressure, and this condition affects close to 1 billion people worldwide. Less than half of these people are on medication, however, and only about half of this group have their blood pressure under good control with such drugs. Older people are less likely to be treated adequately. The majority of people with high blood pressure have the mild type, but even this condition requires attention.

Age and Gender

Age is the major risk factor of hypertension. Blood pressure increases with age in both men and women, and in fact, the lifetime risk for hypertension is nearly 90%. Two-thirds of Americans over age 60 have hypertension. Older women (60 years and above) currently have the highest rates of hypertension, and mortality rates from hypertension are higher in women than in men. Hypertension is also becoming more common in children and teenagers.

Ethnicity

Compared to Caucasians, African Americans have 1.8 times the rate of fatal stroke, 1.5 times the risk for fatal heart disease, and 4.2 times the rates of end-stage kidney disease. In general, about 34% of African American men

and women have hypertension; it may account for over 40% of all deaths in this group.

The prevalence of high blood pressure among African Americans is among the highest in the world. The rates of hypertension in Hispanic Americans, Caucasians, and Native Americans are about equivalent (ranging from 24 - 27%). The rate is much lower in Asian/ Pacific Islanders (9.7% in men and 8.4% in women). However, nearly 75% of older Japanese American men are hypertensive. A number of theories have addressed the reasons for this difference:

- African Americans may have lower levels of nitric oxide and higher levels of a peptide called endothelin-1 (ET-1) than Caucasians. Nitric oxide keeps blood vessels flexible and open and ET-1 narrows blood vessels.
- African Americans have a higher risk for an impaired response to angiotensin (Ang II), which is a peptide important in regulating salt and water balances. African Americans are more likely to be salt-sensitive than other groups.
- Social and income disparities and dietary issues may explain many of the differences in blood pressure rates observed between ethnic groups. For example, while African Americans have a disproportionately high rate of hypertension, one study in rural African villages, where diets are rich in fish, reported only a 3% rate of high blood pressure among inhabitants. Another study reported that Caucasian as well as African Americans in the Southeast have a higher incidence of hypertension and stroke than people in other U.S. regions. The Southeast also has a higher rate of obesity, stress, anxiety, and depression, and diets low in potassium and high in salt, all related to a lower socioeconomic level.
- African Americans have a higher prevalence of risk factors (cardiovascular)

In any case, hypertension appears to be dangerously undertreated in major minority groups. Inadequately controlled hypertension is the major factor for the higher mortality rate from heart disease among African Americans, and special treatment considerations need to be addressed in this population. A 2003 treatment consensus statement released by the International Society on Hypertension in Blacks (ISHIB) advises that many African Americans may need at least two medications to help lower their blood

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pressure. The ISHIB's "15 over 10" rule recommends combination therapy for any patient whose blood pressure exceeds their desired goal by 15 mm Hg systolic or 10 mm Hg diastolic.

Weight

Obesity. About one-third of patients with high blood pressure are overweight. Even moderately obese adults have double the risk of hypertension than people with normal weights. Moreover, the increase in blood pressure in aging Americans may be due primarily to weight gain. (In other cultures old age does not necessarily coincide with weight gain or high blood pressure.) Children and adolescents who are obese are at greater risk for high blood pressure when they reach adulthood.

Thinness. Interestingly, thin people with hypertension are at higher risk for heart attacks and stroke than obese people with high blood pressure. Experts think that thin people with hypertension are likely to have conditions such as an enlarged heart or stiff arteries that cause the blood pressure to rise and also pose greater dangers to health.

Low Birth Weight. Low birth weight, particularly in girls, has been associated with high blood pressure in both childhood and adulthood. One study suggested that breastfeeding these babies may help reduce this risk. Another study reported high levels of stress hormones in babies with low birth weight, which could increase the risk for high blood pressure later on. Low birth weight is also associated with subsequent obesity, a major contributor to hypertension.

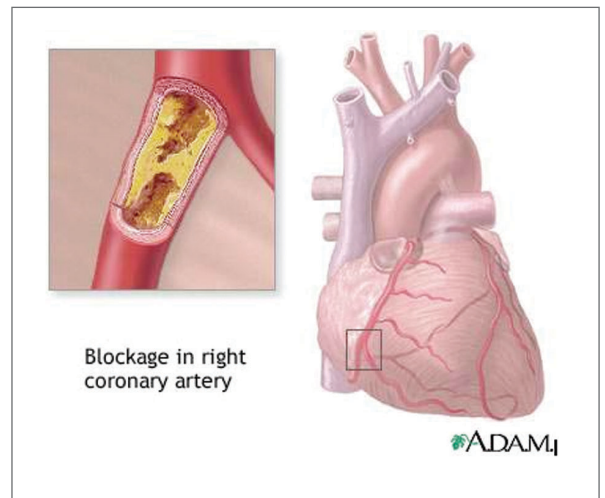
Diabetes

Up to 75% of cardiovascular problems in people with diabetes may be due to hypertension. There are strong biologic links between insulin resistance (with or without diabetes) and hypertension. It is unclear which condition causes the other. Some experts believe angiotensin may be the common factor linking diabetes and high blood pressure. This natural chemical not only influences all aspects of blood pressure control but also interferes with insulin's normal metabolic signaling. People with diabetes or chronic kidney disease need to reduce their blood pressure to 130/80 mm Hg or lower to protect the heart and help prevent other complications common to both diseases. Lowering systolic pressure may be particularly important for people with diabetes.

Effects of Family

Spouses. Studies suggest that spouses of people with high blood pressure are at a much higher risk as well. Such findings indicate that dietary and environmental factors play a role in this disease. Some evidence also indicates that higher risk in spouses may be due to people often choosing mates who are similar to them.

Family History and Genetics. Essential hypertension may be inherited in 30 - 60% of cases. According to one study, being a brother or sister of someone with premature coronary artery disease is a greater risk factor for hypertension than having a parent with the disease. A family history of heart disease is considered to be a major risk factor for high blood pressure in adults under age 65.



Atherosclerosis is a common disorder of the arteries. Fat, cholesterol, and other substances collect in the walls of arteries. Larger accumulations are called atheromas or plaque and can damage artery walls and block blood flow. Severely restricted blood flow in the heart muscle leads to symptoms such as chest pain.

People who are anxious or depressed may have over twice the risk for high blood pressure than those without these problems.

Mental Stress. Recent evidence confirms the association between stress and hypertension. In one 20-year study, men who periodically measured highest on the stress scale were twice as likely to have high blood pressure as those with normal stress. The effects of stress on blood pressure in women were less clear. Job stress and lack of career success have

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been specifically linked to high blood pressure in both men and women.

Anxiety. Studies suggest that anxiety is a risk factor for hypertension, particularly in women.

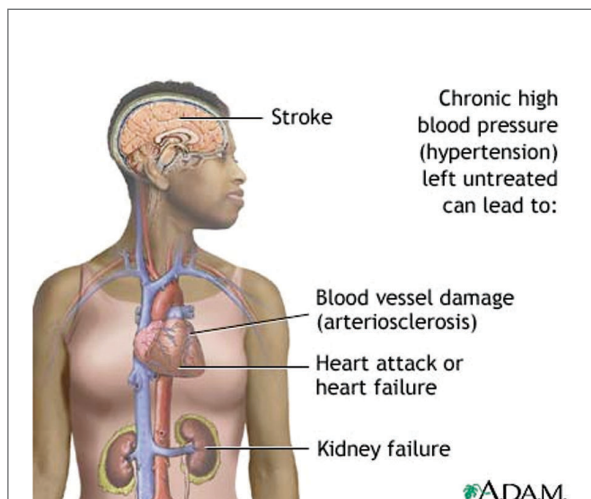
Depression. Mounting evidence suggests that depression has physiological effects that impair the heart and that it contributes to destructive behaviors, such as weight gain, smoking, or alcohol abuse. In one study, those who scored highest on a depression test had about twice the risk of high blood pressure as those with the lowest score. This link was particularly strong in African Americans. Depression was the strongest risk factor in this group.

Time and Seasonal Factors

Blood pressure levels tend to be lowest during the morning and midday hours and highest at the end of the day. Seasonal changes also affect blood pressure, with hypertension increasing during cold months and declining during the summer. Blood pressure readings can vary by as much as 40% depending on the time of day and season.

Complications

Hypertension places stress on several organs (called target organs), including the kidneys, eyes, and heart, causing them to deteriorate over time. High blood pressure was directly responsible for nearly 44,619 American deaths in 2000 and was listed as the primary or contributing cause of death in an estimated 118,000 cases. High blood pressure contributes to 75% of all strokes and heart attacks. It is particularly deadly in African Americans.



Research suggests that prehypertension is also a serious risk factor for heart complications. A 2005 study found that people with prehypertension are three times more likely to have a heart attack, and nearly twice as likely to develop coronary artery disease as people with normal blood pressure.

Hypertension is a disorder characterized by chronically high blood pressure. It must be monitored, treated and controlled by medication, lifestyle changes, or a combination of both.

Emergency Conditions

Malignant hypertension, an emergency condition resulting from untreated primary hypertension, can be lethal.

Stroke

About two-thirds of people who suffer a first stroke have moderate elevated blood pressure (160/95 mm Hg) or above. Hypertensive people have up to 10 times the normal risk of stroke, depending on the severity of the blood pressure. Hypertension is also an important cause of so-called silent cerebral infarcts, blockages in the blood vessels in the brain that may predict major stroke or progression to dementia over time.

Mental Problems and Dementia

Uncontrolled chronic high blood pressure is also associated with reduced short-term memory and mental abilities. Isolated systolic hypertension may pose a particular risk for complications in the brain. Fortunately, controlling blood pressure with medications can reduce or even prevent memory loss and mental decline due to hypertension. (Anti-hypertensive drugs may even help protect against Alzheimer's disease in people with genetic susceptibility to this disease.)

Heart Disease

Among older patients, high blood pressure is the major risk factor for heart disease. Two studies in 2001 reported that high blood pressure in young men also poses a higher risk for heart disease later on, and, in one of the studies, fewer years of life.

Heart Attack. About half of people who suffer their first heart attack have moderate hypertension (160/95 mm Hg) or greater. High blood pressure increases the risk for a heart attack by up to five times, depending on the severity of the hypertension.

Heart Failure. Hypertension precedes heart failure in 75 - 90% of heart failure cases. High blood pressure has various effects that cause the heart to fail, including:

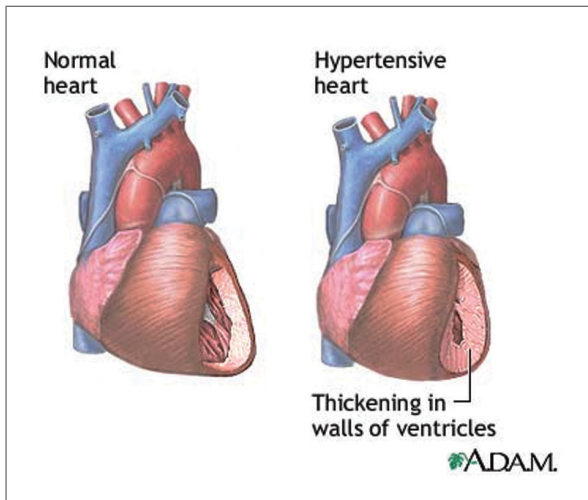
- To compensate for increased blood pressure, the heart must work harder to pump blood, and so its muscles thicken (hypertrophy), usually on the left side (left-ventricle dysfunction).

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These thickened muscles pump inefficiently, and, over time, the force of their contractions weakens. The heart muscles then have difficulty relaxing and filling the heart with blood. The heart begins to fail

HYPERTENSION



Hypertension is a disorder characterized by consistently high blood pressure. Generally, high blood pressure consists of systolic blood pressure (the "top" number, which represents the pressure generated when the heart beats) higher than 140, or diastolic blood pressure (the "bottom" number, which represents the pressure in the vessels when the heart is at rest) over 90.

Review Date: 10/03/2005

Reviewed By: A.D.A.M. Medical Illustration Team

- The failing heart then triggers a number of hormonal and neurochemical mechanisms to correct imbalances in blood pressure and flow. This response, called remodeling, is helpful in the short run but very destructive and irreversible over time.
- As part of the remodeling process, the heart muscle cells elongate. The muscular walls of the heart dilate and become thinner and inefficient. The cells themselves undergo molecular changes that result in calcium loss, a mineral crucial for healthy heart contractions.
- The end-result of remodeling is a falling volume of blood pumped to the kidneys; the kidneys retain water and salt in response, increasing fluid buildup in the body.

- To make matters worse, the body's arteries narrow in response to a lower blood volume. This constriction forces the heart to work even harder to pump blood through these narrowed vessels, increasing blood pressure and continuing the cycle.

Kidney Disease

Diabetes and Nephropathy (Kidney Disease). High blood pressure is strongly associated with diabetic nephropathy. Patients with type 2 diabetes who show early signs of nephropathy already have hypertension. When patients with type 1 diabetes are diagnosed with early nephropathy, on the other hand, they usually have normal blood pressure readings in the doctor's office. A 2002 study using home monitors, however, found that patients with type 1 diabetes often have high systolic blood pressure during sleep-- before development of nephropathy. Home blood pressure monitoring, then, may help identify patients who are at risk for kidney damage due to high systolic pressure.

End-Stage Kidney Disease. High blood pressure causes 30% of all cases of end-stage kidney disease (medically referred to as end-stage renal disease, or ESRD). Only diabetes leads to more cases of kidney failure. Although anti-hypertensive therapy has reduced the incidence of stroke and heart attack, the incidence in ESRD has almost doubled in the last decade.

Kidney Cancer. Men with high blood pressure may also have a higher risk of kidney cancer.

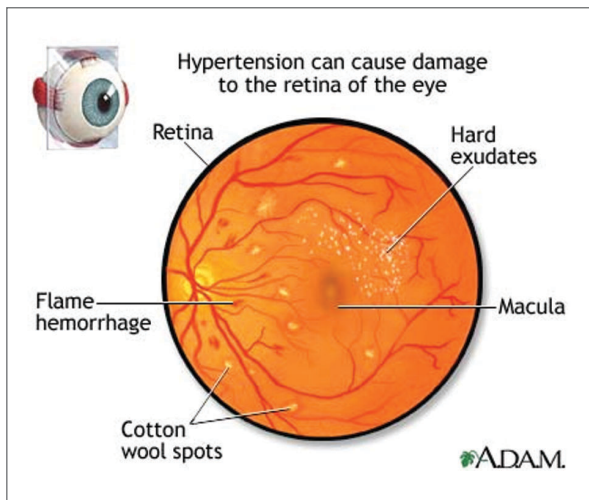
Effect on the Eyes

High blood pressure can injure the eyes, causing a condition called retinopathy.

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HYPERTENSIVE RETINOPATHY



Damage to the retina from high blood pressure is called hypertensive retinopathy. It occurs as the existing high blood pressure changes the microvasculature of the retina. Some of the first findings in the disease are flame hemorrhages and cotton wool spots. As hypertensive retinopathy progresses, hard exudates can appear around the macula along with swelling of the macula and the optic nerve, causing impairment of vision. In severe cases permanent damage to the optic nerve or macula can occur.

Review Date: 04/21/2006

Reviewed By: A.D.A.M. Medical Illustration Team

Bone Loss

Hypertension also increases the elimination of calcium in urine, potentially leading to loss of bone mineral density, a significant risk factor for fractures, particularly in elderly women. In one study, women with the highest levels of blood pressure lost bone density at nearly twice the rate of those in the lowest range. It is not clear whether this effect occurs in men or in non-Caucasian women.

Sexual Dysfunction

Sexual dysfunction is more common and more severe in men with hypertension and in smokers than it is in the general population. Many of the drugs that treat hypertension are thought to cause impotence as a side effect. In these cases, it is reversible when the drugs are stopped. More recent evidence suggests, however, that the disease process that causes hypertension is itself the major cause of erectile dysfunction in these men. Newer anti-hypertensive drugs, including angiotensin-converting enzyme (ACE) inhibitors and angiotensin-receptor blockers (ARBs), are less associated with

erectile dysfunction. ARBs, such as losartan (Cozaar), may be particularly effective in restoring erectile function in men with high blood pressure. Sildenafil (Viagra) is successful in achieving erections in almost two-thirds of patients with controlled high blood pressure. Because sildenafil has a shorter half-life and is eliminated more quickly from the body than newer erectile dysfunction drugs, it may be a safer option for men with hypertension. In a 2003 review of safety data, sildenafil did not appear to pose a risk for men who had both high blood pressure and erectile dysfunction.

Pregnancy and Preeclampsia

Severe, sudden high blood pressure in pregnant women is one component of a condition called preeclampsia (commonly called toxemia) that can be very serious for both mother and child. Preeclampsia occurs in up to 10% of all pregnancies, usually in the third trimester of a first pregnancy, and resolves immediately after delivery. Other symptoms and signs of preeclampsia include protein in the urine, severe headaches, and swollen ankles.

This condition may be caused by a failure of the placenta to embed properly in the uterus, which causes it to misconnect with the mother's blood vessels. As a result, the fetus does not receive a sufficient blood supply, and the mother's own blood pressure increases to replace it.

The reduced supply of blood to the placenta can cause low birth weight and eye or brain damage in the fetus. Severe cases of preeclampsia can cause kidney damage, convulsion, and coma in the mother and can be lethal to both mother and child.

Women at risk for preeclampsia (particularly those with existing hypertension) may benefit from having an ultrasound of uterine arteries at 20 to 24 weeks of pregnancy, followed (if abnormal) by 24-hour blood pressure monitoring.

Uterine Fibroids

High blood pressure may increase the risk of developing fibroids, according to data from the Nurses' Health Study. Tracking women for 10 years, the prospective epidemiologic study found that for every 10 mm/Hg increase in diastolic blood pressure, the risk for developing fibroids increased by 8 - 10%.

Outlook for Children with Hypertension

Children with high blood pressure should first be treated with lifestyle changes, including weight reduction, increased physical activity, and diet modification. If blood pressure is not controlled with lifestyle changes, drug treatment may be required. Although there are few clinical trials conducted in children, a 2005 study found that the angiotensin receptor blocker

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losartan was safe and effective in children. Results of studies evaluating outcomes of children with hypertension suggest that early abnormalities, including enlarged heart and abnormalities in the kidney and eyes, may occur even in children with mild hypertension. Children and adolescents with hypertension should be monitored and evaluated for any early organ damage. Secondary hypertension (high blood pressure due to another disease or drug) is more common in children than adults.

Symptoms

Hypertension has aptly been called the "silent killer" because it usually produces no symptoms. Untreated hypertension increases slowly over the years. It is important for anyone with risk factors to have their blood pressure checked regularly and to make appropriate lifestyle changes. Such recommendations are especially important for individuals who have prehypertension or hypertension, a family history of hypertension, are overweight, or are over age 40.

Symptoms of Malignant Hypertension

In rare cases (fewer than 1% of all patients with hypertension), the blood pressure rises quickly (with diastolic pressure usually rising to 130 mm Hg or higher), resulting in malignant or accelerated hypertension. This is a life-threatening condition and must be treated immediately. People with uncontrolled hypertension or a history of heart failure are at increased risk for this crisis.

People should call a doctor immediately if these symptoms occur:

- Drowsiness
- Confusion
- Headache
- Nausea
- Loss of vision

Treatment

Patients with hypertension should work with their doctors to set blood pressure goals based on individual risk factors. Lifestyle and medication programs need to be planned on an individual basis.

Healthy life style changes are imperative for anyone, and are critical for people with even normal blood pressure (120/80

mm Hg) and above. In appropriate patients, aggressive drug treatment of long-term high blood pressure can significantly reduce the incidence of mental decline and death from heart disease and other serious physical effects of hypertension. In people with diabetes, controlling both blood pressure and blood glucose levels prevents serious complications of that disease. Anti-hypertensive drugs may even prevent mental decline, including in people genetically susceptible to Alzheimer's disease. Nevertheless, only slightly over half of patients with hypertension are treated at all, and only a quarter have adequately controlled pressure.

It is not clear when drugs should be started, particularly for people with prehypertension or mild high blood pressure. To help make treatment choices, the U.S. National Heart, Lung, and Blood Institute has created categories (denoted as groups A, B, and C) according to a patient's risk factors for heart disease. Applying these categories to the severity of hypertension helps determine whether lifestyle changes alone or medications are needed.

Risk Groups	Blood Pressure Stages (Systolic/Diastolic)		
	Prehypertension (120-139/80-89)	Mild (Stage 1) Blood Pressure (140-159/90-99)	Moderate to Severe (Stage 2) Blood Pressure (Systolic pressure over 160 or diastolic pressure over 100)
Risk Group A	Lifestyle changes only.	Lifestyle changes only.	Year trial of lifestyle and medications.
Have no risk factors for heart disease.	(Exercise and dietary program with regular monitoring.)	changes only. If blood pressure is not lower at 1 year, add drug treatments	
Risk Group B Have at least one risk factor for heart disease* (excluding diabetes) but have no target organ damage (such as in the kidneys, eyes, or heart, or existing heart disease).	Lifestyle changes only.	6-month trial of lifestyle changes only. If blood pressure is not lower at 6 months, add drug treatments. Medications considered for patients with multiple risk factors.	Lifestyle changes and medications.
Risk Group C Have diabetes with or without target organ damage and existing heart disease (with or without risk factors for heart disease).	Lifestyle changes and medications.	Lifestyle changes and medications.	Lifestyle changes and medications.

Lifestyle Changes to Improve Blood Pressure

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LIFESTYLE CHANGES TO IMPROVE BLOOD PRESSURE

Review Date: 04/14/2006

Reviewed By: Harvey Simon, MD, Associate Professor of Medicine, Harvard Medical School; Physician, Massachusetts General Hospital.

Lifestyle Changes

Healthy lifestyle changes are an important first step for lowering blood pressure. Current guidelines recommend that people should:

- Exercise at least 30 minutes a day
- Maintain normal weight
- Reduce salt intake
- Increase potassium intake
- Limit alcohol consumption
- Consume a diet rich in fruits, vegetables, and low-fat dairy products while reducing total and saturated fat intake. (The DASH diet is one way of achieving such a dietary plan.)

DASH DIET

The DASH diet (Dietary Approaches to Stop Hypertension) is proving to help lower blood pressure. Results are sometimes seen within a few weeks. Restricting sodium improves results. The diet appears to have antioxidant effects and may help lower LDL cholesterol levels, although beneficial HDL levels also decline.

This diet not only is rich in important nutrients and fiber but also includes foods that contain far more electrolytes, potassium, calcium, and magnesium, than are found in the average American diet.

Follow the DASH diet to potentially lower your blood pressure.



ADAM.

A diet that is effective in lowering blood pressure is called Dietary Approaches to Stop Hypertension (DASH).

Dietary recommendations:

- Reduce saturated fat (but include calcium-rich dairy products that are non- or low-fat).
- When choosing fats, select monounsaturated oils, such as olive or canola oils.
- Choose whole grains over white flour or pasta products.
- Choose fresh fruits and vegetables every day. In one study, people who increased their intake of fruits and vegetables experienced a drop in blood pressure after 6 months. Many of these foods are rich in potassium, fiber, or both, possibly helping lower blood pressure.
- Include nuts, seeds, or legumes (dried beans or peas) daily.
- Choose modest amounts of protein (preferably fish, poultry, or soy products).

Slight changes to the DASH diet might help further lower blood pressure, as well as improve cholesterol and lipid levels. Researchers reporting in the Journal of the American Medical Association and at the 2005 American Heart Association meeting said that replacing some carbohydrates in the DASH diet with more protein (from plant sources) or monounsaturated fats may help further reduce heart disease risk factors.

Salt Restriction

A combination of the DASH diet and salt restriction is extremely effective in reducing blood pressure. Reducing sodium may also help protect against heart failure. People with normal blood pressure should consume no more than 2,400 milligrams (about one teaspoon) of sodium each day. People with blood pressure should consume much less. (Patients should consult their doctor on individual recommendations for salt intake.)

The following higher-risk groups should take particular measures to restrict salt:

- People at Risk for Salt-Sensitivity. About half of people with hypertension have blood pressure that reacts significantly to salt. Such people are known to be salt-sensitive. Groups at particularly high risk for salt-sensitivity include African Americans, the elderly, and people with diabetes. Even people with normal blood pressure can be salt-sensitive. High-salt diets in anyone who is salt-sensitive may harm the heart, kidneys, and brain and increase the risk for death, regardless of blood pressure. Because testing for salt-sensitivity is not easy, experts recommend that everyone proactively restrict

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their daily salt-intake.

- **Overweight People.** Overweight individuals may absorb and retain sodium differently from people with normal weights. Reducing sodium can also help lower the risk of heart disease and stroke in people who are overweight. Unfortunately, because overweight people generally consume more calories, they are also likely take in more sodium.
- **People on Anti-Hypertensive Drugs.** Restricting salt also enhances the benefits of many standard anti-hypertensive drugs by reducing potassium loss, and may help protect against kidney disease in patients who are also taking calcium-blocker drugs. A low-salt diet can also increase the chances for being able to stop such medications.

Simply eliminating table and cooking salt can be beneficial. Salt substitutes, such as Cardia, (containing mixtures of potassium, sodium, and magnesium) are available, but they are expensive. In any case, about 75% of the salt in the typical American diet comes from processed or commercial foods, not from food cooked at home, so the benefits of table-salt substitutes are likely to be very modest. Some sodium is essential to protect the heart, but most experts agree that the amount is significantly less than that found in the average American diet. If people cannot significantly reduce the amount of salt in their diets, adding potassium-rich foods might help to restore a healthy balance.

Potassium

Evidence strongly indicates that a potassium-rich diet can help achieve healthy blood pressure levels, and that potassium supplements can lower systolic blood pressure by 1.8 mm Hg and diastolic blood pressure by 1 mm Hg. Some evidence suggests that a potassium-rich diet can reduce the risk of stroke by 22 - 40%. Current expert guidelines support the use of potassium supplements or enough dietary potassium to achieve 3,500 mg per day for people with normal or high blood pressure (who have no risk factors for excess potassium levels). This goal is particularly important in people who have high sodium intake.

The best source of potassium is the fruits and vegetables that contain them. Some potassium-rich foods include bananas, oranges, pears, prunes, cantaloupes, tomatoes, dried peas and beans, nuts, potatoes, and avocados.

Excess potassium can cause abdominal distress, muscle weakness, and, in rare cases, dangerous heart events. Some people should be particularly cautious about excess potassium, including those with conditions, such as diabetes or kidney disease, that increase potassium levels. People who take medications, such as ACE inhibitors or potassium-sparing

diuretics that limit the kidney's ability to excrete potassium, should not take potassium supplements.

Caffeine, Alcohol, and Smoking

Smoking. Everyone should quit smoking.

Alcohol. People who drink alcohol should do so in moderation. Men with hypertension should limit their intake to no more than one or two drinks a day, and women and lighter people should drink less.

Caffeine Drinks. Coffee drinking is associated with small increases in blood pressure, but the risk is very small in people with normal blood pressure. People with existing hypertension should avoid caffeine altogether.

Other Dietary Considerations

Fiber. Fiber supplementation can help reduce blood pressure levels. It may take up to 8 weeks to achieve the maximum benefit.

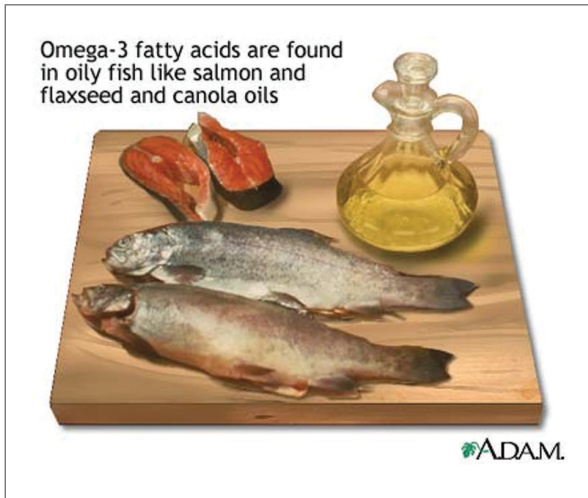
Folate. Increasing folate (a B vitamin) intake to more than 800 mcg/day can help reduce blood pressure, particularly for younger women (under age 46). Dietary sources of folate include citrus fruits, leafy green vegetables, beans, and grain products. Folate helps to reduce homocysteine levels.

Fish Oil and Omega 3 Fatty Acids. Omega 3 fatty acids (docosahexaenoic and eicosapentanoic acids) are found in oily fish. Studies indicate that they may have specific benefits for many medical conditions, including hypertension. They appear to help keep blood vessels flexible and may help protect the nervous system. Fatty acids are also available in supplements, but their long-term effects on blood pressure are unknown.

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OMEGA-3 FATTY ACIDS

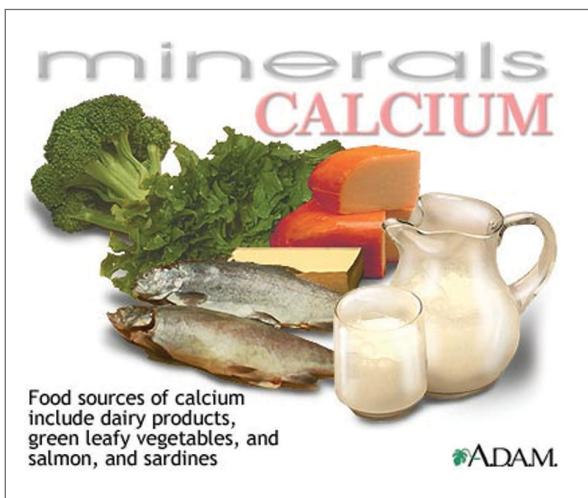


Omega-3 fatty acids, found plentifully in oily fish and flaxseed and canola oils, are beneficial to people afflicted with IBD (inflammatory bowel disease).

Review Date: 10/03/2005
Reviewed By: A.D.A.M. Medical Illustration Team

Calcium. Calcium regulates the tone of the smooth muscles lining blood vessels. Studies have found that people who have sufficient dietary calcium have lower blood pressure than those who do not. Hypertension itself increases calcium loss from the body. The effects of extra calcium on blood pressure, however, are mixed, with some even showing higher pressure.

CALCIUM SOURCE



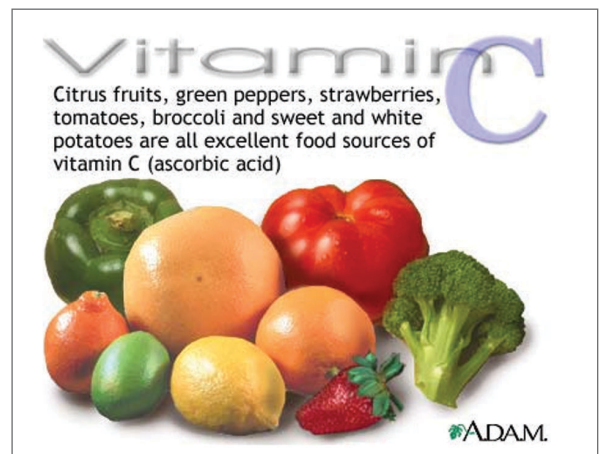
Getting enough calcium to keep bones from thinning throughout a person's life may be made more difficult if that person has lactose intolerance or another reason, such as a tendency toward kidney stones, for avoiding calcium-rich food sources. Calcium deficiency also affects the heart and circulatory system, as well as the secretion of essential hormones. There are many ways to supplement calcium, including a growing number of fortified foods.

Review Date: 09/27/2005
Reviewed By: A.D.A.M. Medical Illustration Team

Magnesium. Some studies reported that magnesium supplements may induce small but significant reductions in blood pressure. No major studies, however, have been done on long-term benefits or risks of magnesium supplements. A major 2001 study on diet found no effect on blood pressure from magnesium intake from foods.

Antioxidant Supplements. Antioxidants are substances that help the body eliminate oxidants, (also called oxygen-free radicals), which are damaging particles produced as part of the body's chemical processes. Some antioxidant supplements, including vitamins C and E and alpha-lipoic acid, are being studied for possible benefits in protecting against hypertension by preventing injury in the blood vessels. Vitamin C may have specific benefits for hypertension by preventing dangerous effects on nitric acid, the substance that keeps arteries flexible.

VITAMIN C SOURCE



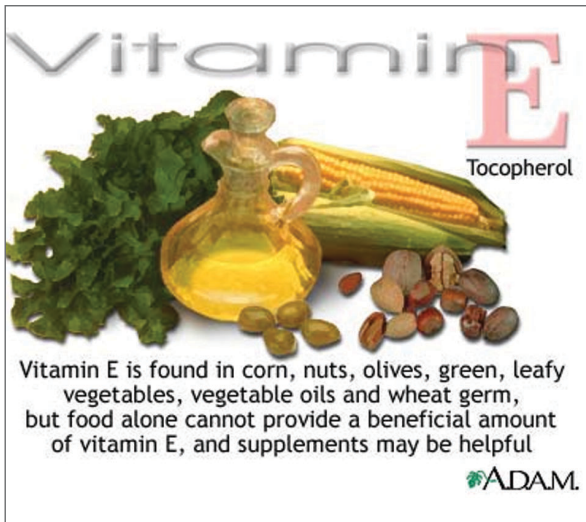
Like most vitamins, vitamin C may be obtained in the recommended amount with a well-balanced diet, including some enriched or fortified foods.

Review Date: 10/12/2005
Reviewed By: A.D.A.M. Medical Illustration Team

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VITAMIN E SOURCE



Because most of the food sources of vitamin E are foods that aren't consumed in large amounts, a therapeutic level of vitamin E may be achieved only with supplements.

Review Date: 10/11/2005

Reviewed By: Aparna Oltikar, M.D., Department of Community Medicine, University of Connecticut School of Medicine, Farmington, CT. Review provided by VeriMed Healthcare Network.

Weight Loss

In people who are overweight, even modest reductions in weight, particularly in the abdominal area, can immediately reduce blood pressure. Weight loss, particularly accompanied by salt restriction, may allow patients with mild hypertension, even older people, to safely reduce or go off medications. The benefits of weight loss on blood pressure are long-lasting.

Exercise

Positive Effects on Blood Pressure. Regular exercise helps keep arteries elastic, even in older people, which in turn ensures blood flow and normal blood pressure. Sedentary people have a 35% greater risk of developing hypertension than athletes. Experts recommend at least 30 minutes of exercise on most -- if not all-days. In one study, moderate exercise (jogging two miles per day) controlled hypertension so well that more than half the patients who had been taking drugs for high blood pressure were able to discontinue their medication.

Studies have also indicated that yoga and Tai Chi, an ancient Chinese exercise involving slow, relaxing movements, may

lower blood pressure almost as well as moderate-intensity aerobic exercises.

High-intensity exercise may not lower blood pressure as effectively as moderate intensity exercise and may be dangerous in people with hypertension.

Negative Effects. Each year an estimated 75,000 heart attacks (5% of all heart attacks) occur after heavy exertion, leading to 25,000 deaths. Older people and those with uncontrolled hypertension or other serious medical conditions should be cautious when exercising. Studies report that older people who begin vigorous exercise are at a slightly higher than average risk for a heart attack during the first year, but over time, regular exercise is likely to be protective.

The following activities may pose particular dangers for high-risk individuals:

- Intense workouts (snow shoveling, slow jogging, speed walking, tennis, heavy lifting, heavy gardening). They tend to stress the heart, raise blood pressure for a brief period, and may cause spasms in the arteries leading to the heart.
- Competitive sports, which couple intense activity with aggressive emotions.

Effects of Anti-Hypertensive Drugs on Exercise. Certain anti-hypertensive medications, including diuretics and beta-blockers, can interfere with exercise capacity. ACE inhibitors or calcium-channel blockers are the best drugs for active individuals. However, patients who take drugs that interfere somewhat with exercise capability should still adhere to an exercise program and consult a doctor on how best to balance medications with exercise.

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LIFESTYLE CHANGES



Hypertension is a disorder characterized by chronically high blood pressure. It must be monitored, treated and controlled by medication, lifestyle changes, or a combination of both.

Review Date: 09/27/2005

Reviewed By: A.D.A.M. Medical Illustration Team

Good Sleep Habits

Certain sleep disorders, especially sleep apnea, are associated with hypertension. Even chronic, insufficient sleep may raise blood pressure in patients with hypertension, placing them at increased risk of heart disease and death. Stress hormone levels increase with sleeplessness, which can activate the sympathetic nervous system, a strong player in hypertension. Patients who have chronic insomnia or other severe sleep disturbances, (particularly sleep apnea), may want to consult a sleep expert. Patients with hypertension who are habitually poor sleepers should consider long-acting blood pressure medications to help counteract the increase in blood pressure that occurs in the early morning hours.

Stress Reduction and Psychologic Considerations

Improving mood or relieving stress may be helpful. The following studies suggested possible benefits:

- Stress reduction programs that use cognitive-behavioral therapy may reduce blood pressure.

- Active religious faith was associated with healthy blood pressure levels, possibly indicating the combined benefits of a strong social network and reduced stress from spiritual activities.

- A simple relaxation technique called transcendental meditation (TM), which involves silent repetition of a single sound, was associated with lower blood pressure. Treating stress cannot cure medical problems. Stress management programs are not a substitute for standard medical treatments, but can be a very important component of a lifestyle plan.

Resources

- www.acc.org -- American College of Cardiology
- www.americanheart.org -- American Heart Association
- www.ash-us.org -- American Society of Hypertension
- www.nhlbi.nih.gov/hbp -- National Heart, Lung, and Blood Institute
- www.nhlbi.nih.gov/health/public/heart/hbp/dash -- DASH diet
- www.ishib.org -- International Society on Hypertension in Blacks
- www.eatright.org -- American Dietetic Association

For more information on improving blood pressure,
please visit: WWW.ALISTROL.COM

Customer Care Representative: **Mr. Steven Kalia - ID # 0025** will more than happy to assist you with your questions or comments. Please feel free to submit your testimonials to customerservice@alistrol.com

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