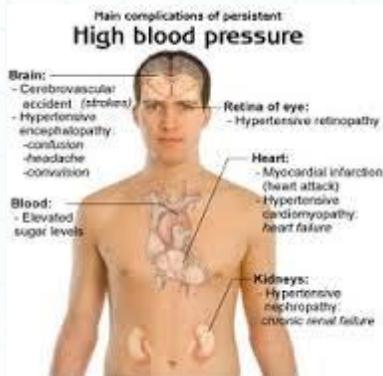


Complications of Hypertension



Complications of hypertension are clinical outcomes that result from persistent elevation of blood pressure. Hypertension is a risk factor for all clinical manifestations of atherosclerosis since it is a risk factor for atherosclerosis itself. It is an independent predisposing factor for heart failure, coronary artery disease, stroke, renal disease, and peripheral arterial disease. It is the most important risk factor for cardiovascular morbidity and mortality, in industrialized countries.

Complications affecting the Heart

Hypertensive heart disease is the result of structural and functional adaptation leading to left ventricular hypertrophy, diastolic dysfunction, CHF, abnormalities of blood flow due to atherosclerotic coronary artery disease and microvascular disease, and cardiac arrhythmias. Individuals with left ventricular hypertrophy are at increased risk for, stroke, CHF, and sudden death. Aggressive control of hypertension can regress or reverse left ventricular hypertrophy and reduce the risk of cardiovascular disease. Left ventricular hypertrophy are seen in 25% of the hypertensive patients and can easily be diagnosed by using echocardiography. Underlying mechanisms of hypertensive left ventricular hypertrophy are of 2 types: mechanical, mainly leading to myocyte hypertrophy; neuro-hormonal, mainly resulting in a fibroblastic proliferation.

Abnormalities of diastolic function, ranging from asymptomatic heart disease[28][29][30] to overt heart failure, are common in hypertensive patients. Patients with diastolic heart failure have a preserved ejection fraction, which is a measure of systolic function.[33][34] Diastolic dysfunction is an early consequence of hypertension-related heart disease and is exacerbated by left ventricular hypertrophy and ischemia.

Complications affecting the Brain:

Hypertension is an important risk factor for brain infarction and hemorrhage. Approximately 85% of strokes are due to infarction and the remainder are due to hemorrhage, either intracerebral hemorrhage or subarachnoid hemorrhage. The incidence of stroke rises progressively with increasing blood pressure levels, particularly systolic blood pressure in

individuals >65 years. Treatment of hypertension convincingly decreases the incidence of both ischemic and hemorrhagic strokes.

Hypertension is also associated with impaired cognition in an aging population. Hypertension-related cognitive impairment and dementia may be a consequence of a single infarct due to occlusion of a "strategic" larger vessel or multiple lacunar infarcts due to occlusive small vessel disease resulting in subcortical white matter ischemia. Several clinical trials suggest that antihypertensive therapy has a beneficial effect on cognitive function, although this remains an active area of investigation.

Cerebral blood flow remains unchanged over a wide range of arterial pressures (mean arterial pressure of 50–150 mmHg) through a process termed autoregulation of blood flow. Signs and symptoms of hypertensive encephalopathy may include severe headache, nausea and vomiting (often of a projectile nature), focal neurologic signs, and alterations in mental status. Untreated, hypertensive encephalopathy may progress to stupor, coma, seizures, and death within hours. It is important to distinguish hypertensive encephalopathy from other neurologic syndromes that may be associated with hypertension, e.g., cerebral ischemia, hemorrhagic or thrombotic stroke, seizure disorder, mass lesions, pseudotumor cerebri, delirium tremens, meningitis, acute intermittent porphyria, traumatic or chemical injury to the brain, and uremic encephalopathy.

Complications affecting the Eyes

Hypertensive retinopathy is a condition characterized by a spectrum of retinal vascular signs in people with elevated blood pressure. It was first described by Liebreich in 1859. The retinal circulation undergoes a series of pathophysiological changes in response to elevated blood pressure. In the initial, vasoconstrictive stage, there is vasospasm and an increase in retinal arteriolar tone owing to local autoregulatory mechanisms. This stage is seen clinically as a generalized narrowing of the retinal arterioles. Persistently elevated blood pressure leads to intimal thickening, hyperplasia of the media wall, and hyaline degeneration in the subsequent, sclerotic, stage. This stage corresponds to more severe generalized and focal areas of arteriolar narrowing, changes in the arteriolar and venular junctions, and alterations in the arteriolar light reflex (i.e., widening and accentuation of the central light reflex, or "copper wiring").

This is followed by an exudative stage, in which there is disruption of the blood–retina barrier, necrosis of the smooth muscles and endothelial cells, exudation of blood and lipids, and retinal ischemia. These changes are manifested in the retina as microaneurysms, hemorrhages, hard exudates, and cotton-wool spots. Swelling of the optic disk may occur at this time and usually indicates severely elevated blood pressure (i.e., malignant hypertension). Because better methods for the control of blood pressure are now available in the general population,

malignant hypertension is rarely seen. In contrast, other retinal vascular complications of hypertension, such as macroaneurysms and branch-vein occlusions, are not uncommon in patients with chronically elevated blood pressure. These stages of hypertensive retinopathy however, may not be sequential. For example, signs of retinopathy that reflect the exudative stage, such as retinal hemorrhage or microaneurysm, may be seen in eyes that do not have features of the sclerotic stage. The exudative signs are nonspecific, since they are seen in diabetes and other conditions.

Complications affecting the Kidneys

Hypertension is a risk factor for renal injury and ESRD. Renal risk appears to be more closely related to systolic than to diastolic blood pressure, and black men are at greater risk than white men for developing ESRD at every level of blood pressure.

The atherosclerotic, hypertension-related vascular lesions in the kidney primarily affect the preglomerular arterioles, resulting in ischemic changes in the glomeruli and postglomerular structures. Glomerular injury may also be a consequence of direct damage to the glomerular capillaries due to glomerular hyperperfusion. Glomerular pathology progresses to glomerulosclerosis, and eventually the renal tubules may also become ischemic and gradually atrophic. The renal lesion associated with malignant hypertension consists of fibrinoid necrosis of the afferent arterioles, sometimes extending into the glomerulus, and may result in focal necrosis of the glomerular tuft.

Clinically, macroalbuminuria (a random urine albumin/creatinine ratio > 300 mg/g) or microalbuminuria (a random urine albumin/creatinine ratio 30–300 mg/g) are early markers of renal injury. These are also risk factors for renal disease progression and for cardiovascular disease.

Complications associated to Diabetes and Hypertension

Diabetes has several complications of which one is hypertension or high blood pressure. Data indicate that at least 60-80 percent of individuals whom develop diabetes will eventually develop high blood pressure. The high blood pressure is gradual at early stages and may take at least 10–15 years to fully develop. Besides diabetes, other factors that may also increase high blood pressure include obesity, insulin resistance and high cholesterol levels. In general, fewer than 25 percent of diabetics have good control of their blood pressure. The presence of high blood pressure in diabetes is associated with a 4 fold increase in death chiefly from heart disease and strokes.

The chief reason why people with diabetes develop high blood pressure is hardening of the arteries. Diabetes tends to speed up the process of atherosclerosis. The other fact about

diabetes is that it affects both large and small blood vessels in the body. Over time, blood vessels become clogged with fatty depots, become non-compliant and lose their elasticity. The process of atherosclerosis is a lot faster in diabetic individuals whom do not have good control of their blood sugars. The high blood pressure eventually leads to heart failure, strokes, heart attacks, blindness, kidney failure, loss of libido and poor circulation of blood in the legs. When the blood supply to the feet is compromised, the chances of infections and amputations also increases. All diabetics should know that even mild elevations in blood pressure can be detrimental to health. Studies have shown that diabetics with even a slight elevation in blood pressure have 2-3 times the risk of heart disease compared to individuals without diabetes.

Blood pressure readings do vary but experts recommend that blood pressure should not range above 140/80. Secondly, high blood pressure is a silent disease and thus it is vital for all diabetics to regularly check their blood pressure or have it checked at a doctor's office on a regular basis. The American Diabetes Association recommends that all diabetics get their blood pressure measured by a health care professional at least 2-5 times a year.

Treatment for diabetic patients with hypertension

Once blood pressure is found to be high in diabetics, there are ways to treat it:

Medications like the Angiotensin-converting enzyme inhibitors (ACEI) are widely used to control blood pressure in diabetics. These medications not only control blood pressure but also delay or prevent the development of kidney disease in diabetes. Many studies have shown that ACEI should be the drugs of first choice in diabetics with high blood pressure. Other medications used to treat high blood pressure include water pills. Sometimes, a combination of medications is used to treat high blood pressure. All diabetics should quit smoking. The combination of diabetes and smoking usually leads to amputations of the toes and feet. Measure your blood sugars regularly, and make sure that they are well balanced as the majority of complications of diabetes can be prevented by ensuring such blood sugars stay within normal limits. It is also recommended to eat a healthy diet and avoid sugary foods and limit the intake of salt. Also, ensure that your cholesterol levels are under control. Exercise is a must for all diabetics. Walking twice a day for 30 minutes can be a fair substitute for those not engaged in intense gym activities. Losing weight is also beneficial as this has been shown to improve blood sugar control, increase insulin sensitivity and reduce blood pressure.

Preeclampsia: High Blood Pressure and Pregnancy

High blood pressure can be a sign of preeclampsia, a pregnancy-related problem that can become life-threatening. Preeclampsia and eclampsia are diseases of pregnancy that involve

the development or worsening of high blood pressure during the second half of pregnancy. Preeclampsia, formerly called "toxemia of pregnancy," may develop into the more severe condition called eclampsia. Eclampsia includes symptoms of preeclampsia, along with seizures.

These conditions, when they develop, occur after 20 weeks of pregnancy. They also may develop shortly after delivery. In very rare situations, they occur before 20 weeks of pregnancy.

High blood pressure is dangerous during pregnancy because it may interfere with the placenta's ability to deliver oxygen and nutrition to your fetus. Your baby may be born weighing less than normal, may have other health problems, and may need to be delivered early.

If your blood pressure continues to climb higher, your kidneys may have trouble functioning. You may have changes in the makeup of your blood, such as a destruction of red blood cells (causing anemia), as well as disturbed liver function and decreased platelets (the blood cells involved in clotting). Too few platelets can increase your risk of bleeding uncontrollably during delivery, or even spontaneously. In addition, the high blood pressure may cause the placenta to begin to separate from the wall of the uterus, called a placental abruption. This can cause severe bleeding and even death of the fetus and possibly the mother.

If you begin to have seizures with a severe form of preeclampsia, you're considered to have eclampsia. This is a life-threatening situation for both mother and baby. During a seizure, mother and her baby are at risk of being deprived of oxygen.

Metabolic Syndrome and High Blood Pressure

Metabolic syndrome is a group of health problems which include too much fat around the waist, elevated blood pressure, elevated blood sugar, and more -- all increasing your risk of heart attack, stroke, and diabetes.

High Blood Pressure and Erectile Dysfunction

High blood pressure by itself can lead to erectile dysfunction. But some drugs for treating high blood pressure can actually be the cause as well. High blood pressure keeps the arteries that carry blood into the penis from dilating the way they're supposed to. It also makes the smooth muscle in the penis lose its ability to relax. As a result, not enough blood flows into the penis to make it erect.

There are eight main ways you can control your blood pressure.

They are:

- Eat a better diet, which may include reducing salt

- Enjoy regular physical activity
- Maintain a healthy weight
- Manage stress
- Avoid tobacco smoke
- Comply with medication prescriptions
- If you drink, limit alcohol
- Understand hot tub safety

Lifestyle modifications are essential. These changes may reduce your blood pressure without the use of prescription medications. Adopting a healthy lifestyle is critical for the prevention of HBP and an indispensable part of managing it. Think of these changes as a "lifestyle prescription" and make every effort to comply with them.

Whether you have been diagnosed with high blood pressure, also called hypertension, or are concerned because you have some of the risk factors for the disease, understand this: while there is no cure, high blood pressure is manageable.

By adopting a heart-healthy lifestyle, you can:

- Reduce high blood pressure
- Prevent or delay the development of HBP
- Enhance the effectiveness of blood pressure medications
- Lower your risk of heart attack, heart disease, stroke and kidney disease

Here's how to do your part:

- Be informed

Of all people with high blood pressure, over 20 percent are unaware of their condition. This symptomless disease could leave them with substantial health consequences. Are you one of them? If you don't know, see a healthcare professional to be tested.

- Do your part to reach your treatment goals

There is no healthy level of high blood pressure. Don't take life-or-death chances with this disease. Instead, take responsibility! Work with your healthcare professional to determine your treatment goals and map out your best action plan for HBP prevention and management.

- Change your life and reduce your risks

Even if your blood pressure is normal (less than 120 mm Hg systolic AND less than 80 mm Hg diastolic) and your goal is prevention only, the lifestyle modifications provide a prescription for healthy living.

If your resting blood pressure falls in the pre-hypertension range (systolic - top- number between 120 and 139 mm Hg OR diastolic - bottom - number between 80 and 89 mm Hg), your doctor will recommend lifestyle modifications.

- Take medication if it is prescribed for you

If your blood pressure is 140/90 or higher, your doctor will likely prescribe medication in addition to lifestyle modifications. Follow your healthcare professional's recommendations carefully, even if it means taking medication every day for the rest of your life. High blood pressure is a lifelong disease, and by partnering with your healthcare team, you can successfully reach your treatment goals and enjoy the benefits of better health.

Once your treatment program becomes routine, maintaining a lower blood pressure is easier. Remind yourself that by managing your blood pressure, you are lowering your risk of heart attack, heart failure, stroke, peripheral artery disease and kidney disease. Death rates from these diseases have decreased significantly, thanks in part to earlier and better treatment of HBP.

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