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Hypertension Epidemic in India- A Comprehensive Review of Clinical Features, Management and Remedies

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ABSTRACT

Antihypertensive drugs are medicines that help lower blood pressure. Fast-moving lifestyles, unearthly hours at work, stress, addiction to alcohol and unhealthy meals are making more and more Indians fall prey to high blood pressure at a very young age. The biggest problem with hypertension is that there are no symptoms. Thus people tend to be unaware that they have hypertension. The prevalence of hypertension ranges from 20-40 per cent in urban adults and 12-17 per cent among rural adults. Experts estimate that the number of patients in India with high BP is likely to rise from about 140 million in 2008 to nearly 215 million by 2030 along with an increase in the risk of complications such as heart attacks, strokes, kidney problems and other serious illnesses.

Introduction

Antihypertensive drugs are medicines that help lower blood pressure in people whose blood pressure is too high. Blood pressure is a measurement of the force with which blood moves through the body's system of blood vessels. Although everyone's blood pressure goes up and down in the course of a typical day,some people have blood pressure that stays high all the time. This condition is known as hypertension. Hypertension is not the same as nervous tension. People who have high blood pressure are not necessarily tense, high-strung, or nervous. They may not even be aware of their condition. Being aware of high blood pressure and doing something to control it are extremely important, however. Untreated, high blood pressure can lead to diseases of the heart and arteries, kidney damage, or stroke, and can shorten life expectancy. Treatments for high blood pressure depends on the type of hypertension. Most cases of high blood pressure are called essential or primary hypertension, meaning that the high blood pressure is not caused by some other medical condition. For most people with primary hypertension, it is difficult to figure out the exact cause of the problem. However, such hypertension usually can be controlled by some combination of antihypertensive drugs and changes in daily habits(such as diet, exercise, and weight control). Controlling primary hypertension is however a lifelong commitment. Although people may be able to reduce the amount of medicine they take as their blood pressure improves, they usually must continue taking it for the rest of their lives. Hypertension is likely going to be a like an epidemic in the near future and approximately one –third of our population will suffer from it. The non-detection of hypertension cases in India further makes the situation worse.'Experts say that the incidence of high blood pressure ranges from 20 to 40 percent in urban areas and 12 to 17 percent in rural areas in India. High blood pressure or hypertension kills nearly 1.5 million people every year in South-East Asia., Unhealthy eating habits, stress and environmental factors lead to high blood pressure cases in urban India.

Hypertension- A Socioeconomic Burden In India

The World Health Organisation (WHO) is finalising a set of nine voluntary global targets that will help in reducing non-communicable diseases (NCDs), particularly hypertension which is a major contributor to cardio-vascular diseases.The voluntary targets being discussed are reduction in premature mortality from NCDs by 25 per cent by 2020 — by reducing intake of alcohol and physical inactivity by 10 per cent each and intake of salt/sodium by 30 per cent. This will reduce high blood pressure incidence by 25 per cent. Use of tobacco is targeted to be brought down by 30 per cent in addition to improving medicines, technology and counselling.Hypertension is a major contributor to avoidable death and disease in India, too, with an increasing impact in the rural areas. Over 140 million people are believed to be suffering from high blood pressure in the country and the number is expected to cross the 214 million mark in 2030. Hypertension is a major risk factor for cardio-vascular diseases that killed 2.7 million people in 2004 and will result in the death of over 4 million people by 2030.An Integrated Disease Surveillance Prevalence Survey of 2007-08 indicates a very high percentage of Indians are in a pre-hypertension stage. Mizoram had 58.5 per cent people in pre-hypertension stage though the actual population suffering from high blood pressure was only 19 per cent. This was followed by Uttarakhand with 48.8 per cent, Kerala (48.1 per cent) and Maharashtra (46.2 per cent). Madhya Pradesh, Tamil Nadu and Andhra Pradesh are among the other States that have over 40 per cent of the population in the pre-hypertension category. "If these people take corrective measures like adopting a healthy lifestyle, they can be prevented from actually getting hypertension. Hypertension has serious economic implications also, as it is a leading cause of hospitalisation and out-patient visits. The annual income loss (calculated in 2004) was Rs.43 billion and

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accounts for 64 per cent of out-of-pocket expenses. A month's treatment with just one anti-hypertensive medication cost 1.8 days wages and becomes unaffordable if more than one drug is prescribed or more than one person has hypertension in the **family.**

Hypertension

Hypertension is a common disorder, if not results in a great probability of coronary thrombosis, strokes and renal failure. Blood pressure above 139 mm Hg systolic and above 89 mm Hg diastolic, is defined as hypertension. The diastolic pressure is often considered more significant.

Hypertension classification

1) Primary or essential hypertension in which definite cause for the increase in blood pressure is unknown.

2) Secondary hypertension in which increase in blood pressure is secondary to renal, endocrine or vascular lesions. Secondary hypertension comprises 5-10% cases of hypertension. Both essential and secondary hypertension may be benign or malignant. Benign hypertension is moderate elevation of blood pressure and the rise is slow over theyears. About 90% patients of hypertension have benign hypertension.

Malignant hypertension is marked and rapid increase of blood pressure to 200/140mm Hg or more and patients have papilloedema, retinal haemorrhages and hypertensive encephalopathy. Less than 5% of hypertensive patients develop malignant hypertension and life expectancy after diagnosis in these patients is less than 2 years if not treated effectively.

Category	Systolic (mm of Hg)	Diastolic (mm of Hg)
Normal	<130	<85
High Normal	130-139	85-89
Hypertension	140-159	90-99
mild stage(stage 1)	160-179	100-109
moderate (stage2)	180-209	110-119
severe (stage 3)	>210	>120
very severe(stage 4)	>200	>140
malignant hypertension		

Clinical classification of hypertension:

Although hypertension is rise in blood pressure above the normal clinical values, which can be mild to malignant and therefore classified clinically as summarized below Etiology and pathogenesis:

Normal blood pressure is regulated by two haemodynamic forces and factors which alter these factors would cause hypertension.

1) Cardiac output

2) Total peripheral vascular resistance

For essential hypertension mainly three following factors are responsible

1) Genetic factors

2) Racial factors

3) Risk factors modifying the course

1) Genetic factors: the role of familial aggregation, occurrence in twins has long been suspected.

2) Racial and environmental factors: higher incidence of essential hypertension is in blacks than in whites. A number of environmental factors like salt intake, obesity, skilled occupation, higher living standards and patients in high stress have been implicated in the development of hypertension.

3) Risk factors: The course of essential hypertension that begins in the middle life is modified by a number of factors like, a) Age, b) Sex, c) Smoking, d) Obesity, e) Excess of alcohol intake and f) Diabetes mellitus For secondary hypertension mainly four factors are responsible like,

1) Hypertension due to renal problems

2) Hypertension to endocrine problems

3) Hypertension associated with coarctation of aorta

4) Neurogenic causes

Renal hypertension is produced by one of the three inter-related mechanisms: a) Activation of renin angiotensin system

b) Sodium and water retention

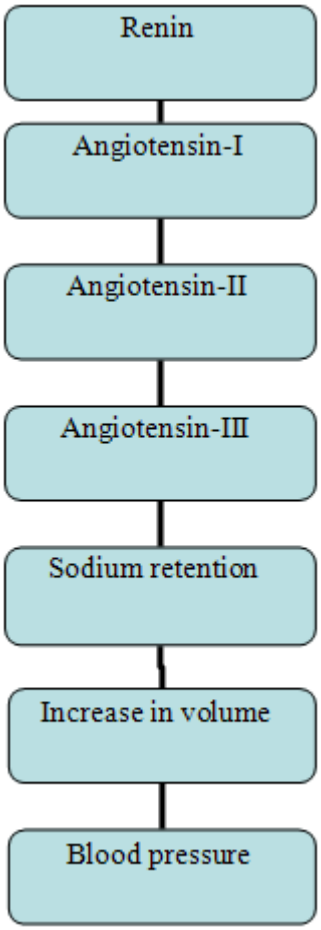
c) Decreased release of vasodepressor materials

Activation of renin angiotensin system is shown as follows: Sodium and water retention regulates blood volume and cardiac output.

Sodium concentration in the blood is regulated by the release of aldosterone reduction in glomerular filtration rate and release of atriopeptin hormone from atria of heart. Decreased release of vasodepressor agents like prostaglandins counters the vasopressor effect of Angiotensin-II.

Endocrinal hypertension is due to a number of endocrinal diseases like adrenocortical hyperfunction, hyperparathyroidism.

Coarctation of aorta causes systolic hypertension due to constriction and diastolic hypertension results from changes in the circulation.



Neurogenic hypertension is due to diseases like psychogenic, polyneuritis, and increase in intracranial pressure.

Pathophysiology:

The pathogenesis of essential hypertension is still unknown. Earlier it was suggested that renal sodium retention expanded vascular volume, increasing cardiac output which led to increased vascular resistance. Later it was suggested that sympathetic nervous system plays primary role. Syndrome

X relationship gives that hypertension is related to obesity, insulin resistance, glucose intolerance and hyperinsulinemia.

Diagnosis:

The diagnosis of hypertension is based on repeated, reproducible measurements of elevated blood pressure. It serves primarily as a prediction of consequences for the patient and includes a statement about the cause of hypertension. Since hypertension is usually asymptomatic until overt end organ damage is imminent its diagnosis depends mainly on measurement of blood pressure and not on symptoms reported by patients.

Treatment:

The first step in treating hypertension may be non-pharmacologic which includes sodium restriction, weight reduction in overweight patients. Pharmacologic management includes a single drug for mild hypertension while for moderate to severe hypertension a combination of two or more drugs.

Antihypertensive agents:

Many different types of drugs are used, alone or in combination with other drugs, to treat high blood pressure. The major categories are:

- Angiotensin-converting enzyme (ACE) inhibitors, such as benazepril (Lotensin), captopril (Capoten), enalapril (Vasotec), lisinopril (Prinivil, Zestril), quinapril(Accupril), and ramipril (Altace). ACE inhibitors work by preventing a chemical in the blood, angiotensin I, from being converted into a substance that increases salt and water retention in the body. These drugs also make blood vessels relax, which further reduces blood pressure.
- Angiotensin II receptor antagonists, such as losartan (Cozaar) and losartan with hydrochlorothiazide (Hyzaar). These drugs act at a later step in the same process that ACE inhibitors affect. Like ACE inhibitors, they lower blood pressure by relaxingblood vessels.
- Beta blockers, such as atenolol (Tenormin), metoprolol(Lopressor), nadolol (Corgard), propranolol (Inderal), and timolol (Blocadren). Beta blockers affect the body's response to certain nerve impulses. This,in turn, decreases the force and rate of the heart's contractions, which lowers blood pressure.
- Blood vessel dilators (vasodilators), such as hydralazine (Apresoline) and minoxidil (Loniten). These drugs lower blood pressure by relaxing muscles in the blood vessel walls.
- Calcium channel blockers, such as amlopidine (Norvasc), diltiazem (Cardizem), isradipine (DynaCirc), nifedipine (Adalat, Procardia), and verapamil (Calan, Isoptin, Verelan).Drugs in this group slow the movement of calcium into the cells of blood vessels. This relaxes the blood vessels and lowers blood pressure.
- Diuretics, such as chlorthalidone (Hygroton), furosemide (Lasix), hydrochlorothiazide (Esidrix, HydroDIURIL), and metolazone (Zaroxolyn). These drugs control blood pressure by eliminating excess salt and water from the body.
- Nerve blockers, such as alpha methyldopa (Aldomet), clonidine (Catapres), guanabenz (Wytensin), guanadrel (Hylorel), guanethidine (Ismelin), prazosin(Minipress), rauwolfia derivatives (Reserpine), and terazosin (Hytrin). These drugs control nerve impulses along certain nerve pathways. This allows blood vesselsto relax and lowers blood pressure.

Precautions

The warnings and precautions given below apply to the use of antihypertensive drugs over a long period of time. These adverse effects are generally not a problem when the drugs are given as a single dose prior to surgery.

Because of the large number of classes and individual drugs in this group, patients should ask their physicians about specific drugs.

Peripheral vasodilators may cause dizziness and orthostatic hypotension—a rapid lowering of blood pressure when the patient stands up in the morning. Patients taking these drugs must be instructed to rise from bed slowly. Pregnancy risk factors for this group are generally category C, meaning they may result in adverse affects on the fetus. Hydralazine has been shown to cause cleft palate in animal studies, but there is no human data available. Breastfeeding is not recommended.

ACE inhibitors are generally well tolerated, but may rarely cause dangerous reactions including laryngospasm and angioedema. Persistent cough is a common side effect. ACE inhibitors should not be used in pregnancy. When used in pregnancy during the second and third trimesters, ACE inhibitors can cause injury to and even death in the developing fetus. When pregnancy is detected, discontinue the ACE inhibitor as soon as possible. Breastfeeding is not recommended. ACE II inhibitors are generally well tolerated and do not cause cough. Pregnancy risk factor is category C during the first trimester and category D (known to cause adverse effects in the fetus) during the second and third trimesters. Drugs that act directly on the renin-angiotensin system can cause fetal and neonatal morbidity and death when administered to pregnant women. Several dozen cases have been reported in patients who were taking ACE inhibitors. When pregnancy is detected, discontinue ACE inhibitors as soon as possible. Breast-feeding is not recommended.

Thiazide diuretics commonly cause potassium depletion. Patients should have potassium supplementation either through diet, or potassium supplements. Pregnancy risk factor is category B (chlorothiazide, chlorthalidone, hydrochlorothiazide, indapamide, metolazone) or category C (bendroflumethiazide, benzthiazide, hydroflumethiazide, methyclothiazide, trichlormethiazide). Routine use during normal pregnancy is inappropriate. Thiazides are found in breast milk. Breastfeeding is not recommended.

Beta blockers may cause a large number of adverse reactions including dangerous heart rate abnormalities. Pregnancy risk factor is category B (acebutolol, pindolol, sotalol) or category C (atenolol, labetalol, esmolol, metoprolol, nadolol, timolol, propranolol, penbutolol, carteolol, bisoprolol). Breastfeeding is not recommended.

Conclusion

Antihypertensive drugs will not cure high blood pressure, but will help control the condition. To avoid the serious health problems that high blood pressure can cause, patients may have to take medicine for the rest of their lives. Furthermore, medicine alone may not be enough. People with high blood pressure also may need to avoid certain foods and keep their weight under control. The health care professional who is treating the condition can offer advice on what measures may be necessary.

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Side Effects

Antihypertensive Drugs	
brand name (generic name)	possible common side effects include:
accupril (quinapril hydrochloride)	headache, dizziness
aldatazide	diarrhea, fever, headache, decreased coordination
aldactone (spironolactone)	cramps, drowsiness, stomach disorders
aldomet (methyldopa)	fluid retention, headache, weak feeling
altace (ramipril)	headache, cough
calan, calan sr (verapamil hydrochloride)	constipation, fatigue, decreased blood pressure
capoten (captopril)	decreased sense of taste, decreased blood pressure tiching, rash
cardene (nicardipine hydrochloride)	dizziness, headache, indigestion and nausea, increased heartbeat
cardizem (diltiazem hydrochloride)	dizziness, fluid retention, headache, nausea, skin rash
cardura (doxazosin mesylate)	dizziness, fatigue, drowsiness, headache
catapres	dry mouth, drowsiness, dizziness, constipation
corgard (nadolol)	behaviorial changes, dizziness, decreased heartbeat, tiredness
corzide	dizziness, decreased heartbeat, fatigue, cold hands and feet
diuril (chlorothiazide)	cramps, constipation or diarrhea, dizziness, fever, increased glocose level in urine
dyazide	blurred vision, muscle and abdominal pain, fatigue
dynacirc (isradipine)	chest pain, fluid retention, headache, fatigue
hydrodiuril (hydrochlorothiazide)	upset stomach, headache, cramps, loss of appetite
hygroton (chlorthalidone)	anemia, constipation or diarrhea, cramps, itching
hytrin (terazosin hydrochloride)	dizziness, labored breathing, nausea, swelling
inderal (propranolol hydrochloride)	constipation or diarrhea, tingling sensation, nausea and vomiting
inderide	blurred vision, cramps, fatigue, loss of appetite
Lasix (furosemide)	back and muscle pain, indigestion, nausea
lopressor (metoprolol tartrate)	diarrhea, itching/rash, tiredness
lotensin (benazepril hydrochloride)	nausea, dizziness, fatigue, headache
alozol (indapamide)	anxiety, headache, loss of energy, muscle cramps
maxzide	cramps, labored breathing, drowsiness, irritated stomach
minipress (prazosin hdrochloride)	headache, nausea, weakness, dizziness
moduretic	diarrhea, fatigue, itching, loss of appetite
monopril (fosinopril sodium)	nausea and vomiting, headache, cough
normodyne (labetalol hydrochloride)	fatigue, nausea, stuffy nose
plendil (felodipine)	pain in back, chest, muscles, joints, and abdomen, itching, dry mouth, respiratory problems
procardia, procardia x (nifedipine)	swelling, constipation, decreased blood pressure, nausea, fatigue
sectral (acebutolol hydrochloride)	constipation or diarrhea, gas, chest and joint pain
Ser-ap-es	blurred vision, cramps, muscle pain, dizziness
tenex (guanfacine hydrochloride)	headache, constipation, dry mouth, weakness
tenoretic	decreased heartbeat, fatigue, nausea
tenormin (atenolol)	nausea, fatigue, dizziness
veseretic	diarrhea, muscle cramps, rash
vasotec (enalapril maleate)	chest pain, blurred vision, constipation or diarrhea, hives, nausea
visken (pindolol)	muscle cramps, labored breathing, nausea, fluid retention
wytensin (guanabenz acetate)	headache, drowsiness, dizziness
zaroxolyn (metolazone)	constipation or diarrhea, chest pain, spasms, nausea
zestoretic (lisinopril hydrochlorothiazide)	fatigue, headache, dizziness
zestril (lisinopril)	labored breathing, abdominal and chest pain, nausea, decreased blood pressure

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