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A REVIEW ARTICLE ON HYPERTENSION

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INTRODUCTION

Hypertension, also known as high or raised blood pressure, is a condition in which the blood vessels have persistently raised pressure. Blood is carried from the heart to all parts of the body in the vessels. Each time the heart beats, it pumps blood into the vessels. Blood pressure is created by the force of blood pushing against the walls of blood vessels (arteries) as it is pumped by the heart. The higher the pressure, the harder the heart has to pump.

Hypertension is a serious medical condition and can increase the risk of heart, brain, kidney and other diseases. It is a major cause of premature death worldwide, with upwards of 1 in 4 men and 1 in 5 women – over a billion people – having the condition. The burden of hypertension is felt disproportionately in low- and middle-income countries, where two thirds of cases are found, largely due to increased risk factors in those populations in recent decades.

Epidemiology

Hypertension is an epidemic affecting one billion people and is the commonest risk factor for death throughout the world. World health statistics 2012 has estimated the prevalence of hypertension to be 29.2% in males and 24.8% in females. Approximately 90 percent for men and women who are non hypertensive at 55 or 65 years will develop hypertension by the age

of 80–85. Hypertension is not limited torich population and affects countries across all income groups. Out of total 58.8million deaths worldwide in year 2004, high blood pressure was responsible for 12.8% (7.5 million deaths). World over hypertension is responsible for 51% of cerebrovascular disease and 45% of ischemic heart disease deaths. Unlike the popular belief that hypertension is more important for high-income countries, people in low- and middle-income countries have more than double the risk of dying of hypertension.

Understanding epidemiology of hypertension will significantly help in decreasing the burden of associated morbidity and mortality. In America, with the help of programs such as National High Blood Pressure Education Program (NHBPEP), the awareness about hypertension has improved from 51 percent in the period 1976–1980 to 70 percent in 1999–2000 and as a result hypertension related morbidity and mortality has substantially improved. Since 1972, age-adjusted death rates from stroke have decreased by about 60% and that by coronary heart disease has decreased by about 50 percent. Recent WHO initiative on non communicable diseases is expected to decrease hypertension related mortality and morbidity globally.

Risk factors

The top 10 risk factors for high blood pressure include:

Being overweight or obese

The more you weigh the more blood flow you need to supply oxygen and nutrients to your tissues. As the volume of blood circulated through your blood vessels increases, so does the pressure inside your arteries.

Too much salt (sodium) in your diet

Too much sodium in your diet can cause your body to retain fluid, and also causes the arteries in your body to constrict. Both factors increase blood pressure.

Too little potassium in your diet

Potassium helps balance the amount of sodium in your cells. Potassium causes the smooth muscle cells in your arteries to relax, which lowers blood pressure.

Not being physically active

Exercise increases blood flow through all arteries of the body, which leads to release of natural hormones and cytokines that relax blood vessels, which in turn lowers blood pressure. Lack of physical activity also increases the risk of being overweight.

Drinking too much alcohol

Having more than two drinks per day can cause hypertension, probably by activating your adrenergic nervous system, causing constriction of blood vessels and simultaneous increase in blood flow and heart rate.

Stress

High levels of stress can lead to a temporary, but dramatic, increase in blood pressure. If you try to relax by eating more, using tobacco or drinking alcohol, you may only exacerbate problems with high blood pressure. Relaxation and meditation techniques effectively lower blood pressure.

Non-steroidal Anti-inflammatory Drugs (NSAIDs)

Ibuprofen (Advil, Motrin, Ibuprofen) can cause marked worsening of existing hypertension or development of new high blood pressure. It can also cause damage to the kidneys, worsening of heart failure, and even heart attack or stroke. Ibuprofen is a member of the class of drugs called NSAIDs, which includes naproxen (Aleve, Naprosyn and Anaprox), sulindac (Clinoril), diclofenac (Voltaren), piroxicam (Feldene), indomethacin (Indocin), Mobic, Lodine and celecoxib (Celebrex).

Cough and Cold Medications (Sudafed and other brands that contain pseudoephedrine and phenylephrine)

Cough and cold medicines frequently contain decongestants such as pseudoephedrine and phenylephrine. These medications cause your blood pressure and heart rate to rise, by constricting all your arteries, not just those in your nose.

Certain chronic conditions

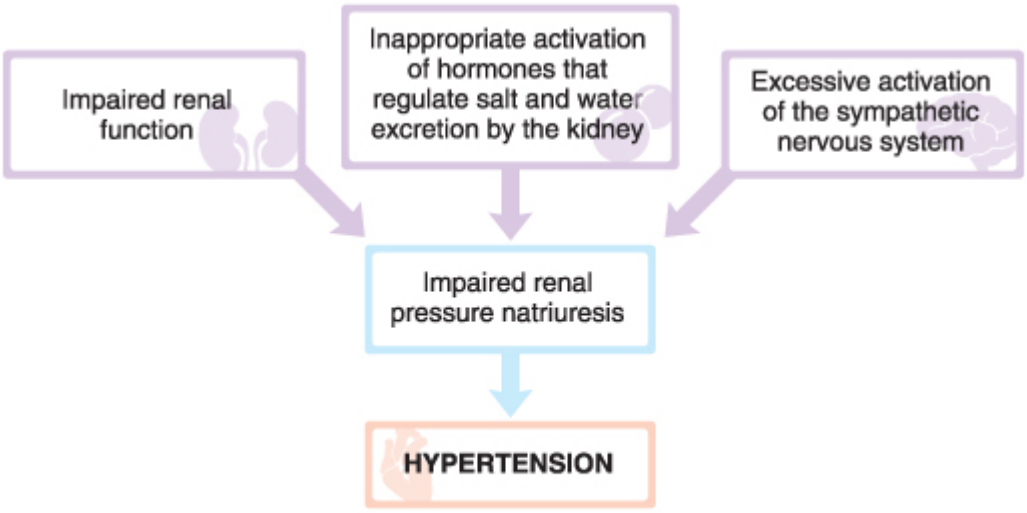
Certain chronic conditions, including diabetes, kidney disease and sleep apnea, also may increase your risk of high blood pressure.

A diet low in vitamin D

It's uncertain if having too little vitamin D in your diet can lead to high blood pressure. Researchers think that vitamin D may affect an enzyme produced by your kidneys that affects your blood pressure. More studies are necessary to determine vitamin D's exact role in high blood pressure. However, talk to your doctor about whether you may benefit from taking a vitamin D supplement.

Pathology

The pathophysiology of hypertension involves the impairment of renal pressure natriuresis, the feedback system in which high blood pressure induces an increase in sodium and water excretion by the kidney that leads to a reduction of the blood pressure. Pressure natriuresis can result from impaired renal function, inappropriate activation of hormones that regulate salt and water excretion by the kidney (such as those in the renin-angiotensin-aldosterone system), or excessive activation of the sympathetic nervous system.



Source: Valentin Fuster, Robert A. Harrington, Jagat Narula, Zubin J. Eapen: Hurst's The Heart, Fourteenth Edition: www.accessmedicine.com

Diagnosis

Measuring Blood Pressure

Blood pressure is most often measured with a device known as a sphygmomanometer, which consists of a stethoscope, arm cuff, dial, pump, and valve.

You can get your blood pressure measured by a health care provider, at a pharmacy, or you can purchase a blood pressure monitor for your home. Home blood pressure readings can be

especially helpful in diagnosing and monitoring hypertension because they represent what is happening in the real world (rather than just at the doctor's office). But before these numbers can be relied on for treatment decisions, it is important to bring the monitor in to your doctor's office and have it checked against the office readings for accuracy. Blood pressure is recorded as two numbers: the systolic and diastolic pressures.

- **Systolic blood pressure** is the maximum pressure during a heartbeat, when the heart is sending blood throughout the body.
- **Diastolic blood pressure** is the lowest pressure between heartbeats, when the heart is filling with blood.

Blood pressure is measured in millimeters of mercury (mm Hg) and is written systolic over diastolic (for example, 120/80 mm Hg, or "120 over 80"). According to the most recent guidelines, a normal blood pressure is less than 120/80 mm Hg. Elevated blood pressure is 120 to 129 and less than 80. Hypertension is blood pressure that is greater than 130/80.

Blood pressure may increase or decrease, depending on your age, heart condition, emotions, activity, and the medications you take. One high reading does not mean you have high blood pressure. It is necessary to measure your blood pressure at different times, while you are resting comfortably for at least five minutes. To make the diagnosis of hypertension, at least three readings that are elevated are usually required.

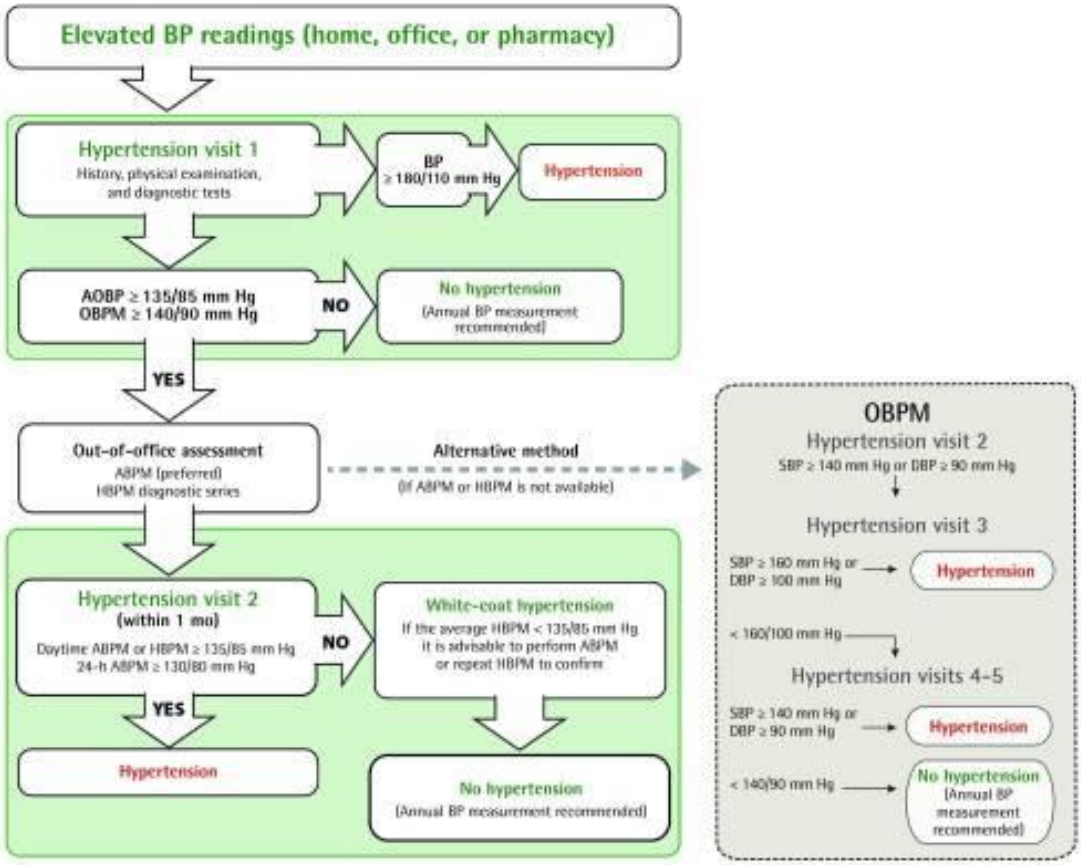
In addition to measuring your blood pressure, your doctor will ask about your medical history (whether you've had heart problems before), assess your risk factors (whether you smoke, have high cholesterol, diabetes, etc.), and talk about your family history (whether any members of your family have had high blood pressure or heart disease).

Your doctor will also conduct a physical exam. As part of this exam, he or she may use a stethoscope to listen to your heart for any abnormal sounds or "murmurs" that could indicate a problem with the valves of the heart. Your doctor will also listen for a whooshing or swishing sound that could indicate your arteries are blocked. Your doctor may also check the pulses in your arm and ankle to determine if they are weak or even absent.

If you're diagnosed with high blood pressure, your doctor may recommend other tests, such as:

- **Electrocardiogram (EKG or ECG):** A test that measures the electrical activity, rate, and rhythm of your heartbeat via electrodes attached to your arms, legs, and chest. The results are recorded on graph paper.
- **Echocardiogram:** This is a test that uses ultrasound waves to provide pictures of the heart's valves and chambers so the pumping action of the heart can be studied and measurement of the chambers and wall thickness of the heart can be made.

Figure 1. Diagnosis of hypertension: *Measurement using electronic (oscillometric) upper-arm devices is preferred over auscultation.*



ABPM—ambulatory blood pressure measurement, AOBP—automated office blood pressure, BP—blood pressure, DBP—diastolic blood pressure, HBPM—home blood pressure measurement, OBPM—office blood pressure measurement, SBP—systolic blood pressure.

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Goals of HTN management

The goal of antihypertensive therapy is the reduction of cardiovascular and renal morbidity and mortality.

Goal BP<140/90 mmHg

Treatment and management

Pharmacotherapy

ACE inhibitors

Angiotensin-converting enzyme (ACE) inhibitors reduce blood pressure by relaxing your blood vessels.

Common examples are enalapril, lisinopril, perindopril and ramipril.

The most common side effect is a persistent dry cough. Other possible side effects include headaches, dizziness and a rash.

Angiotensin-2 receptor blockers (ARBs)

ARBs work in a similar way to ACE inhibitors. They're often recommended if ACE inhibitors cause troublesome side effects.

Common examples are candesartan, irbesartan, losartan, valsartan and olmesartan. Possible side effects include dizziness, headaches, and cold or flu-like symptoms.

Calcium channel blockers

Calcium channel blockers reduce blood pressure by widening your blood vessels.

Common examples are amlodipine, felodipine and nifedipine. Other medicines, such as diltiazem and verapamil, are also available.

Possible side effects include headaches, swollen ankles and constipation.

Drinking grapefruit juice while taking some calcium channel blockers can increase your risk of side effects.

Diuretics

Sometimes known as water pills, diuretics work by flushing excess water and salt from the body through your pee.

They're often used if calcium channel blockers cause troublesome side effects.

Common examples are indapamide and bendroflumethiazide.

Possible side effects include dizziness when standing up, increased thirst, needing to go to the toilet frequently, and a rash.

You might also get low potassium and low sodium after long-term use.

Beta blockers

Beta blockers can reduce blood pressure by making your heart beat more slowly and with less force.

They used to be a popular treatment for high blood pressure, but now tend to be used only when other treatments have not worked.

Common examples are atenolol and bisoprolol.

Possible side effects include dizziness, headaches, tiredness, and cold hands and feet.

Non pharmacotherapy

cut your salt intake to less than 6g (0.2oz) a day, which is about a teaspoonful - find out how you can reduce the amount of salt in your diet eat a low-fat, balanced diet - including plenty of fresh fruit and vegetables; get tips on eating more healthily be active - read some tips about getting more exercise cut down on alcohol - get tips on cutting down, including downloading a drinks diary and keeping track of your drinking lose weight - find out what your ideal weight is using the BMI healthy weighcalculator and read advice about losing weight if you're overweight drink less caffeine - found in coffee, tea and cola stop smoking - get help quitting**.**

REFERENCE

1. https://www.google.com/search?q=goals+of+htn+management&rlz=1C1CHBD_enIN906IN906&sxsrf=ALeKk02elAAS23aVyRkTi5x-Kn5EVIqAYQ:1594822539983&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjWveb3uM_qAhVUfX0KHakPAT4Q_AUoAXoECA0QAw&cshid=1594822729790049&biw=1536&bih=674#imgrc=KzTfqmdHnRcPzM
2. https://www.nejm.org/doi/full/10.1056/NEJMcp1613481
3. https://www.nhs.uk/conditions/high-blood-pressure-hypertension/treatment/
4. https://www.who.int/health-topics/hypertension/#tab=tab_1
5. https://www.webmd.com/hypertension-high-blood-pressure/guide/hypertension-treatment-care
6. https://emedicine.medscape.com/article/241381-treatment
7. https://www.webmd.com/hypertension-high-blood-pressure/guide/whypertension-diagnosing-high-blood-pressure#1
8. https://www.heart.org/en/health-topics/high-blood-pressure/the-facts-about-high-blood-pressure/how-high-blood-pressure-is-diagnosed