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Department of Biomedical Engineering

Course Name: 19GET277 – Biology for Engineers

IV Year : VII Semester

UNIT III – HUMAN DISEASES

Topic : Definition, Causes, symptoms, Diagnosis, Treatment and prevention of Hypertension



INTRODUCTION

- Hypertension, or high blood pressure, is a common condition affecting millions worldwide. It is also known as a silent killer as it does not show any symptoms and it often goes unnoticed, leading to serious health issues.
- Nearly 1.28 billion people have been estimated to have hypertension around the globe.
- High blood pressure is when the force of blood pushing against your artery walls is consistently too high. This damages your arteries over time and can lead to serious complications like heart attack and stroke.



BLOOD PRESSURE MEASUREMENT

- Blood pressure (BP) is the measurement of the pressure or force of blood pushing against blood vessel walls. Your BP reading has two numbers.
- The top number is the systolic blood pressure, which measures the pressure on your artery walls when your heart beats or contracts.
- The bottom number is the diastolic blood pressure. This measures the pressure on your artery walls between beats when your heart is relaxing.
- Blood pressure is measured in millimeters of mercury (mmHg).



DIAGNOSIS

- If a person has a blood pressure of 140/90 mmHg he/she is considered to have high blood pressure.
- Healthcare providers diagnose high blood pressure by measuring it with an arm cuff.
- Hypertension is diagnosed if, when it is measured on two different days, the systolic blood pressure readings on both days is ≥ 140 mmHg and/or the diastolic blood pressure readings on both days is ≥ 90 mmHg.





TYPES



- **Primary hypertension:**
Causes of this more common type of high blood pressure (about 90% of all adult cases in the U.S.) include aging and lifestyle factors like not getting enough exercise.
- **Secondary hypertension:**
Causes of this type of high blood pressure include different medical conditions or a medication you're taking.
- **Primary and secondary high blood pressure (hypertension) can co-exist.** For example, a new secondary cause can make blood pressure that's already high get even higher.
- **Other temporary hypertensions include**
 - White coat hypertension:** Your BP is normal at home but elevated in a healthcare setting.
 - Masked hypertension:** Your BP is normal in a healthcare setting but elevated at home.
 - Sustained hypertension:** Your BP is elevated in healthcare settings and at home.
 - Nocturnal hypertension:** Your BP goes up when you sleep.



CAUSES

Primary hypertension doesn't have a single, clear cause. Usually, many factors come together to cause it. Common causes include:

- Unhealthy eating patterns (including a diet high in sodium).
- Lack of physical activity.
- High consumption of beverages containing alcohol.

Secondary hypertension has at least one distinct cause that healthcare providers can identify. Common causes of secondary hypertension include:

- Certain medications, including immunosuppressants and oral contraceptives (the pill).
- Kidney disease.
- Obstructive sleep apnea
- Recreational drug use (including amphetamines and cocaine).
- Renal vascular diseases, which are conditions that affect blood flow in your kidneys' arteries and veins.
- Tobacco use (including smoking, vaping and using smokeless tobacco).



RISK



High blood pressure has certain risk factors:

- Having biological family members with high blood pressure, cardiovascular disease or diabetes.
- Being over age 55.
- Having certain medical conditions, including chronic kidney disease, metabolic syndrome, obstructive sleep apnea or thyroid disease.
- Having overweight or obesity.
- Not getting enough exercise.
- Eating foods high in sodium.
- Smoking or using tobacco products.
- Drinking too much.



TREATMENT

High blood pressure treatments include lifestyle changes and medications. Healthcare providers recommend treatment based on your blood pressure readings, the causes of your high blood pressure and your underlying conditions.

Four classes of blood pressure medications are “first-line” (most effective and commonly prescribed) when starting treatment:

- Angiotensin-converting enzyme (ACE) inhibitors block the production of the angiotensin II hormone, which the body naturally uses to manage blood pressure.
- Angiotensin II receptor blockers (ARBs) block this same hormone from binding with receptors in the blood vessels.
- Calcium channel blockers prevent calcium from entering the muscle cells of your heart and blood vessels, allowing these vessels to relax.
- Diuretics (water or fluid pills) flush excess sodium from your body, reducing the amount of fluid in your blood. People often take diuretics with other high blood pressure medicines, sometimes in one combined pill.



MANAGEMENT

In some cases, it's possible to lower your blood pressure without medication.

Here are some proven ways to lower your blood pressure naturally:

- Keep a weight that's healthy for you. Your healthcare provider can give you a target range.
- Eat a healthy diet. An example is the DASH diet. This is a way of eating that's full of fruits, vegetables, whole grains and low-fat dairy.
- Cut down on salt. Ideally, limit your sodium intake to no more than 1,500 milligrams (mg) per day.
- Get enough potassium. Try to consume 3,500 to 5,000 milligrams per day. Some foods high in potassium include bananas, avocados and potatoes (with skin).
- Exercise. In general, start slow and work your way up to 150 minutes of aerobic exercise per week. Resistance training (like lifting light weights) is also helpful.



Vision Tit 2

THANK YOU

Vision Title 3