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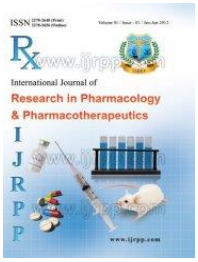

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Assessment of comorbities in hypertension patients

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ABSTRACT

Persistently elevated systemic arterial blood pressure is an important risk factor for most of the disease like cardiovascular problems, brain stroke, and kidney disease. Some of the people are unaware about that they have the hypertension and it leads to various diseases. Blood pressure is measured in systole (the pressure in blood vessels when heart contracts or beats) and diastole (the pressure in the blood vessels when the heart rest between beats) According to WHO, The normal range was (130/80) .The aetiology of hypertension involves genetic factors and pathophysiological factors that affect multiple systems in the body. The various pathophysiology factors include cardiac output and peripheral resistance, renin angiotensin system.

Keywords: Hypertension, Heart, patients, Pathophysiology

INTRODUCTION

Hypertension is a worldwide epidemic; in many countries, 50% of the population >60 years of age has hypertension. Hypertension is defined as a repeatedly elevated blood pressure (BP) exceeding 140/90 mm Hg. The prevalence of hypertension is steadily increasing, even with the expanded use of antihypertensive medications. It is widely recognized that hypertension is associated with increased cardiovascular and all-cause mortality independently of other risk factors.

TYPES OF HYPERTENSION

Essential hypertension

In as many as 95% of high blood pressure cases in the U.S. The underlying cause can't be found. This type of high blood pressure is called "essential hypertension."

Though essential hypertension remains somewhat mysterious, it has been linked to certain risk factors. High blood pressure tends to run in families and is more likely to affect men than women. Age and race also play a role. In the United States, blacks are twice as likely as whites to have high blood pressure, although the gap begins to narrow around age. After age 65, black women have the highest incidence of high blood pressure.

Essential hypertension is also greatly influenced by diet and lifestyle. The link between salt and high blood pressure is especially compelling. People living on the northern islands of Japan eat more salt per capita than anyone else in the world and have the highest incidence of essential hypertension.

Most people with high blood pressure are "salt sensitive," meaning that anything more than the minimal bodily need for salt is too much for them and increase their blood pressure. Other factors that can raise the risk of having essential hypertension include obesity; diabetes; stress; insufficient intake of potassium, calcium, and magnesium; lack of physical activity; and chronic alcohol consumption.

Secondary hypertension

When a direct cause for high blood pressure can be identified, the condition is described as secondary hypertension. Among the known causes of secondary hypertension, kidney disease ranks highest. Hypertension can also be triggered by tumors or other abnormalities that cause the adrenal glands (small glands that sit atop the kidneys) to secrete excess amounts of the hormones that elevate blood pressure. Birth control pills -- specifically those containing estrogen -- and pregnancy can boost blood pressure, as can medications that constrict blood vessels.

Symptoms

Most people with high blood pressure have no signs or symptoms, even if blood pressure readings reach dangerously high levels.

A few people with high blood pressure may have headaches, shortness of breath or nosebleeds, but these signs and symptoms aren't specific and usually don't occur until high blood pressure has reached a severe or life-threatening stage.

Risk Factors

High blood pressure has many risk factors, including:

Age

The risk of high blood pressure increases as you age. Until about age 64, high blood pressure is more common in men. Women are more likely to develop high blood pressure after age 65.

Race

High blood pressure is particularly common among people of African heritage, often developing at an earlier age than it does in whites. Serious complications, such as stroke, heart attack and kidney failure, also are more common in people of African heritage.

Family history

High blood pressure tends to run in families. Being overweight or obese. The more you weight, the more blood you need to supply oxygen and nutrients to your tissues. As the amount of blood flow through your blood vessels increases, so does the pressure on your artery walls.

Not being physically active. People who are inactive tend to have higher heart rates. The higher your heart rate, the harder your heart must work with each contraction and the stronger the force on your arteries. Lack of physical activity also increases the risk of being overweight.

Using Tobacco

Not only does smoking or chewing tobacco immediately raise your blood pressure temporarily, but the chemicals in tobacco can damage the lining of your artery walls. This can cause your arteries to narrow and increase your risk of heart disease. Passive smoker also have increased risk of heart diseases.

Too much salt (sodium) in your diet

Too much sodium in your diet can cause your body to retain fluid, which increases blood pressure.

Too little potassium in your diet: Potassium helps balance the amount of sodium in your cells. A proper balance of potassium is critical for good heart health. If you don't get enough potassium in your diet, or you lose too much potassium due to dehydration or other health conditions, sodium can build up in your blood.

Drinking too much alcohol

Over time, heavy drinking can damage your heart. Having more than one drink a day for women and more than two drinks a day for men may affect your blood pressure. If you drink alcohol, do so in moderation. For healthy adults, that means up to one drink a day for women and two drinks a day for men. One drink equals 12 ounces of beer, 5 ounces of wine or 1.5 ounces of 80-proof liquor.

Stress

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

PATHOPYSIOLOGY

Cardiac output and peripheral resistance

Maintenance of a normal blood pressure is dependent on the balance between the cardiac output and peripheral vascular resistance. Most patients with essential hypertension have a normal cardiac output but a raised peripheral resistance. Peripheral resistance is determined not by large arteries or the capillaries but by small arterioles, the walls of which contain smooth muscle cells. Contraction of smooth muscle cells is thought to be related to a rise in intracellular calcium concentration, which may explain the vasodilatory effect of drugs that block the calcium channels. Prolonged smooth muscle constriction is thought to induce structural changes with thickening of the arteriolar vessel walls possibly mediated by angiotensin, leading to an irreversible rise in peripheral resistance. It has been postulated that in very early hypertension the peripheral resistance is not raised and the elevation of the blood pressure is caused by a raised cardiac output, which is related to sympathetic overactivity. The subsequent rise in peripheral arteriolar resistance might therefore develop in a compensatory manner to prevent the raised pressure being transmitted to the capillary bed where it would substantially affect cell homeostasis.

Renin-angiotensin system

The renin-angiotensin system may be the most important of the endocrine systems that affect the control of blood pressure. Renin is secreted from the juxtaglomerular apparatus of the kidney in response to glomerular underperfusion or a reduced salt intake. It is also released in response to stimulation from the sympathetic nervous system.

Renin is responsible for converting renin substrate (angiotensinogen) to angiotensin I, a physiologically inactive substance which is rapidly converted to angiotensin II in the lungs by angiotensin converting enzyme (ACE). Angiotensin II is a potent vasoconstrictor and thus causes a rise in blood pressure. In addition, it stimulates the release of aldosterone from the zona glomerulosa of the adrenal gland, which results in a further rise in blood pressure related to sodium and water retention. The circulating renin-angiotensin system is not thought to be directly responsible for the rise in blood pressure in essential hypertension. In particular, many hypertensive patients have low levels of renin and angiotensin II (especially elderly and black people), and drugs that block the renin-angiotensin system are not particularly effective. There is, however, increasing evidence that there are important non-circulating “local” renin-angiotensin epicrine or paracrine systems, which also control blood pressure. Local renin systems have been reported in the kidney, the heart, and the arterial tree. They may have important roles in regulating regional blood flow.

Autonomic nervous system

Sympathetic nervous system stimulation can cause both arteriolar constriction and arteriolar dilatation. Thus the autonomic nervous system has an important role in maintaining a normal blood pressure. It is also important in the mediation of short term changes in blood pressure in response to stress and physical exercise. There is, however, little evidence to suggest that epinephrine (adrenaline) and norepinephrine (noradrenaline) have any clear role in the aetiology of hypertension. It is probable that hypertension is related to an interaction between the autonomic nervous system and the renin-angiotensin system, together with other factors, including sodium, circulating volume.

Endothelial dysfunction

Vascular endothelial cells play a key role in cardiovascular regulation by producing a number of potent local vasoactive agents, including the vasodilator molecule nitric oxide and the vasoconstrictor peptide endothelia. Dysfunction of the endothelium has been implicated in human essential hypertension. Endothelial dysfunction is primary and becomes irreversible once the hypertensive process has become established.

Vasoactive substances

Many other vasoactive systems and mechanisms affecting sodium transport and vascular tone are involved in the maintenance of a normal blood

pressure. Bradykinin is a potent vasodilator that is inactivated by angiotensin converting enzyme.

Endothelin is a recently discovered, powerful, vascular, endothelial vasoconstrictor, which may produce a salt sensitive rise in blood pressure. It also activates local renin-angiotensin systems. Endothelial derived relaxant factor, now known to be nitric oxide, is produced by arterial and venous endothelium and diffuses through the vessel wall into the smooth muscle causing vasodilatation.

Atrial natriuretic peptide is a hormone secreted from the atria of the heart in response to increased blood volume. Its effect is to increase sodium and water excretion from the kidney as a sort of natural diuretic.

Hypercoagulability

Patients with hypertension demonstrate abnormalities of vessel wall (endothelial dysfunction or damage), the blood constituents (abnormal levels of haemostatic factors, platelet activation, and fibrinolysis), and blood flow (rheology, viscosity, and flow reserve), suggesting that hypertension confers a prothrombotic or hypercoagulable state.

Comorbidities

Coronary artery disease**,** Stroke**,** Chronic kidney diseases

INTERLINK BETWEEN MYOCARDIAL INFRACTION AND HYPERTENSION

Mechanisms

High blood pressure forces the heart to work harder to pump blood to the rest of the body. This causes the left ventricle a thickened left ventricle increases and its recurring association with female sex, diabetes, older age, less frequent smoking and more frequent vascular comorbities composes the increased risk of heart attack, heart failure and sudden cardiac death, heart failure.

Interlink between hypertension and stroke

Blood vessels damaged by high blood pressure can narrow, rupture or leak. High blood pressure can also cause blood clots to form in the arteries leading to the brain, blocking blood flow and potentially causing a stroke.

Interlink between hypertension and kidney disease

High blood pressure can constrict and narrowing the blood vessels, which eventually damages and weakens them throughout the body, including in the kidneys. The narrowing reduces blood flow .these narrowing arteries are not able to deliver enough blood to the kidney tissue.

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