

The Nutrition Therapy, Treatment, Pathophysiology, Etiology, Epidemiology of Hypertension

Ayesha Mushtaq*, Roshaan Mehmood

Consultant Dietitian/Nutritionist.

***Corresponding Author:** Ayesha Mushtaq, Consultant Dietitian/Nutritionist.

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Abstract

Hypertension is both a cardiovascular condition and risk factor for other forms of cardiovascular disease. An increase in BP increases the forces applied to the endothelium and can cause initiation of an atherosclerotic lesion. Changes in pressure may also cause established plaques to rupture, which not only can initiate an event such as an infarct but also cause a proliferation of existing plaques. From 40 to 70 years of age, an increase of systolic BP by 20 mmHg increases risk of CVD in systolic blood pressure of hypertensive will prevent one death for every 11 patients treated. Basically, hypertension is a condition of chronically elevated blood pressure. Nutrition treatment of hypertension include lifestyle modification in which nutrition therapy, physical activity, ideal BMI, weight loss goals are added to prevent the more risk. Furthermore, the DASH is used to approach the nutrition therapy for hypertension. Minerals are added to diet to treat the hypertension i.e., potassium, calcium magnesium have all been positively correlated with reduction of BP and treatment of hypertension. It is important to remember that the nutritional effects demonstrated by the DASH study and in particular the relationship between K, Ca, Mg and blood pressure reduction were a result of a dietary pattern rich in these nutrients rather than mineral intake from supplements.

Keywords: cardiovascular disease, BP increases, nutrition therapy, hypertension.

Biography

Currently I am working with UK based company Splitechs Business Solution as consultant and as Corporate Liaison and dealing online page as a dietitian and counselor and I spend 2.5 years at Gym names AYMZ to serve community about the diet and nutrition free of cost. I am graduate and scholar of M. PHIL had experience in my field and teaching as well. Had organized many events few are Olympiad, MUST Marketing Gala, Esprenza and NEXUS. Work as ambassador in WWF Pakistan and had best ambassador award in an event named Tech Quest organized by American Society of mechanical engineering. Have completed internship in District Hospital Mirpur. I have training through different workshop names: Robotics Workshop organized by Islamic International University Islamabad. Promoting democracy: Engaging Youth, women and inclusive communities by Pakistan U.S Alumni Network Community Project. Leadership training for women by Kashmir Institute of

International relations. Personality development workshop and character building by Safe Pakistan. I have five publications in different international journal. I am currently doing research in obesity and effect of flaxseed on reduction and moringa leaves effects of hair growth.

Hypertension

Hypertension refers to chronic elevation in BP. A measurement of blood pressure is expressed using the reading for systolic pressure as the first (higher) number and the reading for diastolic pressure as the second (lower) number. A reading above 140/90 mmHg is considered to be the hypertensive. However, it is not necessary for both systolic and diastolic blood pressure to be elevated for and individual to be considered hypertensive; thus, readings of 140/80 mmHg or 120/90 mmHg are both high—i.e., they represent elevations in either systolic BP or diastolic BP. (1) An individual who is currently taking antihypertensive medication is considered to have hypertension regardless of his or her BP

reading. It is important to check BP because it often also goes undiagnosed in its early stages. It is frequently referred to as the “Silent Killer”, because there are typically no symptoms. Hypertension can cause congestive heart failure, kidney failure, myocardial infarction, stroke, and aneurysms if left untreated. Vision problems may occur due to blood vessels bursting or bleeding within the eyes. Hypertension may also cause decreased left ventricular ejection fraction, ventricular arrhythmias, and sudden cardiac death. According to statistics compiled by the American Heart Association 77% of individuals who have a first stroke, 69% who have congestive heart failure have hypertension. Thus, hypertension is a strong risk factor for subsequent CVD morbidity/mortality. (2)

Hypertension—condition of chronically elevated blood pressure.

Epidemiology

Approximately 65 million adults have hypertension and an additional 59 million people have prehypertension. In 2003, more than 52,600 people in the U.S, died as direct result of hypertension. Hypertension occurs in one out of every three adults. In addition, hypertension was listed as a primary or contributing cause of more than 277,000 deaths in the U.S. that year. (3)

The rates of hypertension vary by gender %. Mexican-American have higher rate, at 27.8% and 28.7% for males and females, respectively. White males at 30.6% have lower prevalence of hypertension than white females, at 31.0%. The prevalence of hypertension is highest among blacks, at 41.8% for males and 45.4% for females. Asian females have higher prevalence of hypertension than males. (1)

Etiology

There two types of hypertensions. Primary or essential hypertension is idiopathic, which means there is no known cause, and accounts for about 90% of all cases. Hence, the overwhelming majority is idiopathic. Secondary hypertension occurs as a result of another primary problem, such as renal disease, other cardiovascular disease, endocrine disorders, or neurogenic disorders, such as might occur in the compression of carnial nerves.

Though its cause is unknown, primary hypertension may be a result of a variety of factors. (3)

Lifestyle factors such as diet (including excessive sodium intake), exercise, smoking, stress, and obesity all contribute to development of primary hypertension. Poor lifestyle choices may exacerbate

the problem, since it appears to have strong genetic component. Numerous genes have been found that contribute to the management of sodium and most probably play a role in the development of hypertension. The development and progression of hypertension may also be due to inflammatory responses and individual differences within the renin-angiotensin-aldosterone control of blood pressure. Dietary factors also play an important role in the development of hypertension. (4)

Pathophysiology

VASOPRESSIN AND ANGIOTENSIN II, cause vasoconstriction and fluid retention. Both will increase BP. Often hypertension individuals have excessive secretion of vasopressin from the hypothalamus. Hypertensive individuals may also have variation in the gene that produces angiotensinogen. An increased production of angiotensinogen may increase production of angiotensin II, thus increasing BP. (5)

Though the mechanisms are not fully understood, smoking is known to be risk factor for the development of hypertension. Smoking causes acute and chronic elevations in blood pressure. The relationship may be partially explained by the fact that cigarette smoking interferes with the action of nitrous oxide, thus impairing endothelial relaxation and vasodilation. (6)

In renal disease, blood flow is reduced through the kidney, because of either atherosclerosis within the lumen of a renal artery or compression of a vessel by a tumor. In order to improve blood flow, angiotensin II is released. This causes vasoconstriction and promotes sodium, chloride and water retention, which increase blood volume. The increase in blood volume and vasoconstriction both act to increase arterial pressure. (7)

Hypertension related to the endocrine system may occur with adrenal disorders that cause excessive secretion of epinephrine and norepinephrine. Hyperinsulinemia, may also play a role in the development of hypertension in some individuals, though the relationships remain unclear and controversial. (8)

Neurological disease impacting the medulla oblongata can cause change in blood pressure control. This is because the cardiovascular control center, located in the medulla oblongata, helps to maintain the balance between the sympathetic and parasympathetic nervous system. If the balance is disrupted, appropriate BP will not be maintained. For example, in patient with increased structure sleep

apnea, sympathetic activity increases heart rate, sodium reabsorption, cardiac output, and peripheral resistance, thus increasing blood pressure. (9)

Treatment

The goal of treatment for hypertension are reduction in the risk of cardiovascular and renal disease and reduction of BP to <140 href="#_ENREF_10">10)

In order to change BP, either cardiac output or peripheral resistance must be altered, Pharmacological interventions include several major classes of medications that use one or both of these mechanisms. Major groups of diuretics include “loop” diuretics, thiazides, carbonic anhydrase inhibitors, and potassium-sparing diuretics. The final class of medications that can be used in treatment for hypertension are the aldosterone antagonists (spironolactone and eplerenone), which suppress the actions of aldosterone. The type of medication regimen is determined by the classification of hypertension and other risk factors. (11)

Nutrition Therapy

Nutrition Implication

Nutritional treatment of hypertension includes both lifestyle modifications and nutrition therapy. Increased physical activity, smoking cessation, and weight loss, as well as reduction of sodium and alcohol intake, are primary strategies. In past decades several clinical trials including the landmark dietary approaches to stop hypertension (DASH) and the PREMIER trails have revealed that nutrition interventions that include decreasing sodium, saturated fat, and alcohol while increasing calcium, potassium, and fiber have demonstrated significant effects for lowering blood pressure. (12)

Nutrition Implication

A comprehensive approach that addresses multiple lifestyle factors has the most significant effect on blood pressure control for hypertension individuals.

Weight Loss

Weight reduction is standard component of nutrition therapy for treatment of hypertension. Meta analyses of studies conducted between 1966 and 2002 and my opinion and practical done since 2015 continue to support this recommendation. Within the 26 studies recently reviewed, weight loss of greater than 5kg reduced both diastolic and systolic BP. An approximately weight loss will result in lowered systolic BP, and even less than 10% weight loss has sustained effect on BP.

Though waist circumference is related to body weight

is related to body weight, it is an independent predictor of hypertension risk. For those patients who fall within a normal or overweight BMI, waist circumstances should be measured. It is not necessary to measure waist circumference for those patients with a BMI>35, because it adds no additional predictive power. (13)

Sodium

Although the use of sodium restriction to manage BP has been a controversial issue, consistent evidence has supported the efficacy of a reduction of sodium for controlling BP. Large population studies, such as the INTERSALT Study, have confirmed that urinary sodium excretion has significant and direct relationship with systolic blood pressure. It has been estimated that sodium modifications may reduce incidence of hypertension by as much as 17%. The DASH trails have further supported the role of sodium reduction in treatment for hypertension. BP control through sodium restriction could reduce the incidence of cardiovascular disease, renal disease, and stroke. (14)

Americans consume high amounts of sodium, in part because of the amounts used in processed foods. Average sodium intake for Americans ranges between 3000 and 4500 mg/day (130-195 mEq Na or 8-10 g of sodium chloride). The diet guidelines for Americans recommend an intake of less than 2300 mg of sodium, the equivalent of 6 g of sodium chloride. (15)

Because only small amounts of sodium occur naturally in food, effective reduction of sodium intake requires limiting the intake of highly processed foods, avoiding those foods that are cured using salt, and omitting salt during the cooking and preparation of foods. The practitioner should teach the client strategies for limiting intake to 2400 mg/day (104 mEq) and provide information on the sodium content of foods. (16)

Potassium, Calcium and Magnesium

Potassium, calcium and magnesium have all been positively correlated with reduction of BP and treatment of hypertension. The role of these minerals as part of nutrition therapy for hypertension is highlighted by the results of DASH studies. All three minerals appear to have an inverse relationship to hypertension suggesting that as dietary intakes increase, BP decreases.

The relationship between potassium and BP is a strong inverse relationship. The diet used in the DASH trails provided an average of 406 g of

potassium/day from fruits and vegetables. These intakes were associated with reduced blood pressure. (16)

The relationship between calcium and hypertension has been studied for over 25 years. The most dramatic relationship between calcium and blood pressure reduction was seen in the DASH trials. The DASH diets provided the equivalent of 3 cups of dairy products as their major source of calcium. In a recent trial, intakes of lower-fat milk and milk products were correlated with lower rates of hypertension but this relationship was sustained for whole milk products. At present, more specific recommendations for calcium intake in hypertension have not been established beyond the recognizes DRI levels. (16)

It is important to remember that the nutritional effects demonstrated by the DASH study and in particular the relationship between K, Ca, Mg and blood pressure reduction were a result of a dietary pattern rich in these nutrients rather than mineral intake from supplements. (3)

DASH—Dietary Approach to Stop Hypertension

Nutrition therapy for hypertension with a comprehensive dietary method was brought to the forefront with the dietary approaches to stop hypertension (DASH). These clinical trials focused on the use of a variety of foods that not only reduced sodium intake within a moderate energy intake. At 2000 kcal a day the DASH sodium diet provides approximately 4,700 mg potassium, 500 mg magnesium, 1240 mg calcium, 90 g protein, 30 g fiber, and 2400 mg sodium. It is observed that DASH supported the reduction of BP. (17)

Physical Activity

According to almost every dietitian and researcher that physical activity of 30 minutes per day does decrease blood pressure. Moreover, increasing physical activity decreases the relative workload on the heart for all forms of activity, a benefit important for all forms of cardiovascular disease. For instance, mowing the lawn requires a certain percentage of one's maximal functional capacity. If a person starts a walking program and improves their cardiorespiratory fitness, then mowing the lawn will require a lower percentage of their functional capacity. Since the relative strain on the cardiovascular system will be reduced the BP response to the activity will be reduced as well. Furthermore, increasing physical activity will facilitate weight management. (18)

Smoking Cessation

When an individual quits smoking, they realize health benefits almost immediately. Smoking cessation may be the most important change any individual can make to reduce their risk of hypertension and all forms of cardiovascular disease. All smoking cessation plans are not equal, and each individual should seek out a program that suits his or her needs. In order to achieve success, the smoker should also be able to identify his or her reason for quitting.

The American lung association has developed a three-step quit smoking action plan that can be accessed online at <http://www.lungusa.org>

Developing the Nutrition Therapy Prescription

Evidence based guideline should utilized to provide nutrition therapy to patient. Education is a key component of providing nutrition therapy. Nutrition therapy is guided by the patient's hypertension history, other medical risk factor, and current medical treatment. (19)(20)

Conclusions

The article has illustrated the impact of nutrition as controllable risk factors, as a means to prevent disease, and as a critical component of medical treatment. Management of hypertension, weight management, physical activity and smoking cessation are common targets. Lifestyle modifications begin with management of these controllable risk factors.

The initial strategies strategy should be weight management and increased physical activity. A well-established relationship exists between increased body weight and hypertension state. Using research and principle of the DASH diet, the therapeutic Lifestyle Changes diet and extensive skills for individualization of patient education and behavior modification, the registered dietitian is uniquely situated to impact the extent of cardiovascular disease within the population and to impact an individual's quality of life with overall improvement of health and wellbeing.

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