

Dietry and lifestyle effect on Hypertension.

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ABSTRACT

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Dietary and life style modification plays a crucial role in both patients who are suffering from hypertension, as well as those who are in healthy states. Weight loss by diet can reduce BP, for instance, restriction in salt intake by avoiding excessive amount of salt in food and in cooking. Other restriction are also taken into consideration during person suffering from hypertension like moderate alcohol consumption (1-2 drinks per days) while on other hand increase in potassium intake can be effective against lowering of BP by taking rich diet in fruits, vegetable and beans. Vegetarian diet also shows beneficial impacts against BP. Physical exercises play an important role in reducing BP (yoga and medication). Thus by adopting these restriction and implementations of such type of non pharmaceutical methods the BP and heart disorders can be effectively controlled.

Key-words: Lifestyle modifications, Hypertension, patient compliance.

INTRODUCTION

Hypertension is well established as a cardio vascular risk factor. A major part of population may ignore this condition and suffers a lot. The only an important factor which can prevent hypertension is to implementation of non pharmacological measures such as, diet, life style changes. Non pharmacological measures are also important due to increasing cost of anti hypertensive drugs. Hypertension is a disease of complex etiology; affecting 972 million people worldwide. It is estimated that the worldwide prevalence of hypertension would increase from 26.4% in 2000 to 29.2% in 2025.¹ Hypertension is an important risk factor for cardiovascular disease and has become a major global burden on public health. Worldwide, 7.1 million deaths (approximately 12.8% of the global total) were estimated to be due to non-optimal blood pressure.² The world health organization has suggested that sub optimal treatment of hypertension represents the number one risk for death in the world.³ The Seventh report of the Joint National Committee on prevention, detection, evaluation and treatment of high blood pressure (JNC-7) defines hypertension as a Systolic Blood Pressure greater than 140 mmHg or a Diastolic Blood Pressure greater than 90 mm Hg.⁴ Essential hypertension is

commonly known as Hypertension. In most cases, elevated blood pressure is associated with an overall increase in resistance to flow of blood through arterioles, while cardiac output is usually normal. Meticulous investigation of autonomic nervous system function, baroreceptor reflexes, the renin-angiotensin-aldosterone system (RAAS) and the kidney has failed to identify a primary abnormality as the cause of increased peripheral vascular resistance in essential hypertension.⁵ Secondary hypertension can be of two types, Remediable Hypertension- It is usually caused by renal disease, adrenal disease, coarctation of the aorta, or another rare condition. Drug induced hypertension-Certain drugs like oral contraceptives, NASIADS, etc, Natural products like Ma-huang, Nicotine, Ketamine etc and chemical elements like Lead and Mercury may also cause elevation in blood pressure.⁵

Role of the vascular endothelium and Regulation of blood pressure

The vascular endothelium is presently considered a vital organ, where synthesis of various vasodilating and constricting mediators occurs. Numerous hormonal, humeral vasoactive and growth and regulating peptides are produced in the vascular endothelium. These mediators include angiotensin II, bradykinin, endothelin, nitric oxide and several other growth factors. Endothelin is a potent vasoconstrictor and growth factor, dysfunction of which has been implicated in human essential hypertension.⁶

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Angiotensin II is a potent vasoconstrictor synthesized from angiotensin I with the help of an angiotensin-converting enzyme (ACE). Peripheral vascular resistance is dependent upon the sympathetic nervous system, humoral factors and local autoregulation.⁶ The sympathetic nervous system produces its effects via the vasoconstrictor alpha effect or the vasodilator beta effect. The humoral actions on peripheral resistance are also mediated by other mediators such as vasoconstrictors (angiotensin and catecholamines) or vasodilators (prostaglandins and kinins). Autoregulation of blood pressure occurs by way of intravascular volume contraction and expansion, as well as by transfer of transcapillary fluid. Interactions between cardiac output and peripheral resistance are autoregulated to maintain a set blood pressure in an individual.⁷ The pathogenesis of essential hypertension is multifactorial and highly complex. Multiple factors modulate the blood pressure for adequate tissue perfusion and include humoral mediators, vascular reactivity, circulating blood volume, vascular caliber, blood viscosity, cardiac output, blood vessel elasticity and neural stimulation.⁷ The chronic phase of essential hypertension characteristically has normal or reduced cardiac output and elevated systemic vascular resistance.⁷ Hypertension is likely to be related to multiple genes. Hypertension develops secondary to multiple environmental factors, as well as to several genes, whose inheritance appears to be complex. Very rare secondary causes are related to single genes.⁷ Hypertension typically has no symptoms that is why it is known as silent killer. In majority of patients the only sign is substantially increased blood pressure. However, careful examination of retina of eye may reveal various abnormalities which are known as Keith-wagener retinal changes. If a person has high blood pressure that is severe or longstanding and left untreated, symptoms such as headache, fatigue, nausea, vomiting, shortness of breath, restlessness and blurred vision can occur as a result of damage to the brain, eyes, heart and kidneys. In rare cases, high blood pressure may cause brain swelling, which can lead to drowsiness and coma.⁸ Routine Investigations of hypertensive patient should includes, chest X-Ray, ECG, echocardiography, urinalysis, fasting blood lipids and urea creatinine and blood electrolytes levels.⁸

Diagnosis of hypertension is generally on the basis of a persistently high blood pressure. Usually this requires three separate measurements atleast one week apart. Measurements in control of hypertension should be atleast 1 hour after caffeine, 30 minutes after smoking or strenuous exercise and without any stress. The person taking the measurement should

be careful to inflate the cuff suitably above anticipated systolic pressure. The person should inflate the cuff to 200 mmHg and then slowly release the air while palpating the radial pulse. After one minute, the cuff should be reinflated to 30 mmHg higher than the pressure at which the radial pulse was no longer palpable. A stethoscope should be placed lightly over the brachial artery. The cuff should be at the level of the heart and the cuff should be deflated at a rate of 2 to 3 mmHg/s. Systolic pressure is the pressure reading at the onset of the sounds described by Korotkoff (Phase one). Diastolic pressure is then recorded as the pressure at which the sounds disappear (K5) or sometimes the K4 point, where the sound is abruptly muffled. Two measurements should be made at least 5 minutes apart and, if there is a discrepancy of more than 5 mmHg, a third reading should be done. The readings should then be averaged. An initial measurement should include both arms.⁹

Goals of Hypertension Treatment

The primary goal of treatment of the hypertensive patient is to achieve the maximum reduction in the long-term total risk of cardiovascular morbidity and mortality. This requires treatment of all the reversible risk factors identified, including smoking, dyslipidaemia or diabetes and the appropriate management of associated clinical conditions, as well as treatment of the raised blood pressure.¹⁰ Hypertension is usually present for many years before its complications develop. The idea, therefore, is to treat hypertension early, before it damages important organs in the body. Accordingly, increased public awareness and screening programs to detect early, uncomplicated hypertension are the keys to successful treatment of high blood pressure. By treating high blood pressure successfully early enough, the risk of stroke, heart attack and kidney failure can be reduced.¹¹

Lifestyle Modifications

Lifestyle modifications are generally beneficial in reducing a variety of CVD risk factors (including high BP) and promoting good health and should therefore be used in all hypertensive patients, either as definitive treatment or as an adjunct to drug therapy¹². A reasonable generalized approach for all patients includes weight loss for the overweight patients, regular physical activity, alcohol cessation or moderate intake, dietary modification to reduce sodium and fat and increase calcium, potassium, magnesium, vitamins and fiber from food sources; and cessation of smoking¹². Following Points should be considered while starting treatment for hypertension. Blood pressure that is persistently

higher than 140/ 90 mm Hg usually is treated with lifestyle modifications and medication. If the diastolic pressure remains at a borderline level (usually under 90 mm Hg, yet persistently above 85) then more aggressive treatment also may be started in certain circumstances.¹³ The choice of drugs will be influenced by many factors, like previous experience of the patient with antihypertensive agents, cost of drugs, risk profile, presence or absence of target organ damage, clinical cardiovascular or renal diseases or diabetes and patient's preference.

Quality of life (QOL)

Quality of life is generally considered a multidimensional construct that includes physical, mental and social functioning, as well as perceptions of general well-being. Nowadays, QOL can be measured objectively with questionnaires (instruments) possessing sufficient sensitivity to change, reliability and validity properties.¹⁴ It has been a fundamental research topic in health, as its results are important to assess the effectiveness of care as well as to obtain social and health funding.¹⁵

Role of pharmacist in pharmaceutical care of hypertension.

Involvement by the pharmacist in the Pharmaceutical care for essential hypertension patients has been shown to have a consistently positive impact on both community pharmacy¹⁶ and organized health care settings¹⁷. In these trials, involvement by pharmacist has been shown to bring about improved compliance, improved BP control, improved patient understanding of hypertension and improved satisfaction with care. The JNC-7 Guidelines strongly recommend the use of a multidisciplinary approach to the hypertensive patients, with the pharmacist as the integral part of the team of care. Hypertension remains a largely untapped area for pharmacist participation in collaborative drug therapy management to optimize control of BP in a vast patient population.

CONCLUSION

Dietary and life style modification highly influenced hypertensive condition for better prevention of hypertension. It is also important in reduction of BP in large population and reduction of various cardiac disorders. This targets can be achieved only by nurse based health care settings and proper monitoring for patient compliance.

REFERENCES

1. Andersson B, Elam M, Wallin BG, Bjorntorp P, Anderson OK 1991 effect on energy restricted diet on sympathetic muscle nerve activity in obese women. *Hypertension* 11:223-229
2. Barden A, Beilin LJ, vandogen R, Puddey IB 1991 A double blind placebo-controlled trial of the effects of short term potassium supplementation on blood pressure and atrial natriuretic peptide in normotensive women. *American journal of hypertension* 4:206-213.
3. Elliott P, Stamler J, Nichols R et al for the Intersalt Cooperative Research Group 1996 Intersalt revisited: further analysis of 24 hour sodium excretion and blood pressure within and across populations. *British Medical Journal* 312:149-1253
4. Elliot P, Dyer A, Stamler R on behalf of the INTERSALT Co-operative Research Group 1989 The INTERSALT study: results for 24 hour sodium and potassium, by age and sex. *Journal of Human Hypertension* 3:323-330
5. Elliott P 1994 Nutritional factors in blood pressure. *Journal of Human Hypertension* 8:595-601
6. Fagard R 1995 The role of exercise in blood pressure control: supportive evidence. *Journal of Hypertension* 13:1223-1227
7. Franssila-Kallunki A, Rissanen A, Ekstrand A, Ollus A, Groop L 1992 Effects of weight loss on substrate oxidation, energy expenditure, and insulin sensitivity in obese individuals. *American Journal of Clinical Nutrition* 55:356-361
8. Furda I 1990 Interaction of dietary fibre with lipids – mechanistic theories and their limitation. In: Furda I, Brine CJ (ed) *New developments in dietary fibre*. Plenum Press, New York: 67-82
9. Gordon T, Kannel WB 1976 Obesity and cardiovascular diseases: the Framingham study. *Clinics in Endocrinology and Metabolism* 5:367-375
10. Elliott P, Stamler J, Nichols R et al for the Intersalt Cooperative Research Group 1996 Intersalt revisited: further analysis of 24 hour sodium excretion and blood pressure within and across populations. *British Medical Journal* 312:149-1253
11. Eraker SA, Kirscht JP, Becker MH 1984 Understanding and improving patient compliance. *Annals of Internal*

Medicine 100:258-268

12. Hallaq H, Smith TW, Leaf A 1992 Modulation of dihydropyridine - sensitive calcium channels in heart cells by fish oil fatty acids. Proceedings of the National Academy of Sciences of the USA 89:1760-1764.
13. Logan AG 1985 Role of paraprofessionals in improving compliance with antihypertensive treatment. Journal of Hypertension 3(suppl 1): 65-68.
14. Cutler JA, Brittain E 1990 Calcium and blood pressure. An epidemiologic perspective. American Journal of Hypertension 3: 137S-146S
15. MacMahon S 1987 Alcohol consumption and hypertension. Hypertension 9:111-121
16. Logan AG, Irving MJ 1994 Compliance, labelling and hypertension. In: Swales JD (ed) Textbook of Hypertension. Blackwell Scientific, Oxford: 1267-1282
917) MacMahon S 1987 Alcohol consumption and hypertension. Hypertension 9:111-121
17. MacMahon S, Peto R, Curler Jet al 1990 Blood pressure, stroke and coronary heart disease. I. Prolonged differences in blood pressure: prospective observational studies corrected for the regression dilution bias` Lancet 335:765-774.