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A Study of Lipid Profile in Hypertension

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Review Article

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ABSTRACT

Hypertension (HTN) is the most widespread disorder in many nations of the world now-a-days. Many people throughout the world have high BP. The estimate of disease statistic is around 1 billion. Generally 7.1 million deaths occur due to hypertension. It is the condition where the force of the blood against the artery walls is too high. The system that regulates the center is Renin–angiotensin system that produces associate degree accelerator proteinase - a proteinase, which is made up of cells that surround capillary vessel afferent arterioles in response to variety of stimuli, as well as reduced urinary organ pressure, decrease in Intravascular volume, exaggerated sympathetic system activity, exaggerated artery stretch, and other effects. Renin acts on angiotensinogen to break off the peptide angiotensin I. This amide is then acted upon by Hypertension -converting accelerator (ACE) to make the eight-amino-acid amide angiotensin II, a potent agent and stimulant of mineral corticoid release from the adrenal glands. Despite the role of proteinase within the regulation of pressure level, it most likely doesn't play a central role within the pathologic process of most primary or essential hypertension; solely 10% patients have high proteinase activity, where as 60% have stable levels and 30% have decreased levels. In the article we would be discussing about the role of lipid content and its effect on hypertension.

INTRODUCTION

Generally many people have high blood pressure commonly referred to as hypertension unnoticed for years without any visible symptoms. The symptoms may not be clearly noticed but the damage to blood vessels and heart continues to strain the heart and increases the risk of stroke and eventually leads to sudden demise [1-5]. Hypertension is a common problem faced by many people in the world now-a-days. It is the state or condition where the blood flows through the blood vessels with high force than the normal ultimately leading to stroke[6-10]. On the other hand dyslipidemia is the condition where increased levels of plasma cholesterol, triglycerides in the blood results in causing atherosclerosis. Both the factors are responsible for leading to cardiovascular diseases. This mini-review, discusses the relation of dyslipidemia to hypertension known as 'LIPITENSION' for easy identification and treatment of both medical conditions [11-15]. Most of patients do not experience symptoms, which lead to non-adherence to hypertension treatment[6,17,18].

Dyslipidemia, one of the common reason leading to cardiovascular diseases, causes damage and loss

of effective activity of the cardiovascular system [19,20]. The statistical analysis of existence of lipitension range from 15 to 31% in India. The chance of getting lipitension was 20% in women versus 16% in men and varies in different age groups of people. The treatment of these disorders, particularly in high-risk patients, requires multiple preventive measures, including proper diet and pharmacological factors [21-23]. The need for a treatment approach in CV medicine has commenced, due to coexisting problems of a geriatric people and less response to complex drug courses. This has led to development of combination drug courses. This step can be helpful to treat both hypertension and dyslipidemia [24,25].

INTER-RELATIONSHIP BETWEEN HYPERTENSION AND DYSLIPIDEMIA

Several previous studies showed the relation between hyperlipidemia and hypertension. An excessive daily intake of saturated fats, cholesterol, and other sources of calories and disturbance of lipid profile leads to hypertriglyceridemia and hypercholesterolemia further causing obesity and consequently hypertension [26,27]. Dyslipidemia is more common in patient not treated for hypertension than normotensives, and lipid levels shoots up as BP increases gradually. Though no specific reason for dyslipidemia has been consistently known among affected individuals, research shows that total cholesterol (TC) levels and lipoproteins [28,29,30] tend to be more among hypertensive patients than in the general population. The lipide profile is employed as a part of a risk assessment to confirm a person's risk of cardiopathy and to assist physicians to make a choice concerning what treatment [31,32] could also be best if there's borderline or high risk. Lipids area unit a gaggle of fats and fat-like substances that include vital constituents of cells and sources of energy [33]. Hence maintaining healthy levels of those lipids is very important in staying healthy. Approximately 40% of persons with essential hypertension also have hypercholesterolemia [34-36].

CAUSES OF HYPERTENSION

Generally hypertension may be the result of many factors and they are as follows:

- It may occur due to excessive smoking [37,38]
- Highly obese people are more prone to the disease
- It may occur due to lack of proper exercise and physical activity
- Intake of more salt in the food
- Increase in intake of alcohol
- It may also occur due to stress condition, old age, family genetic history
- Sometimes chronic kidney diseases and thyroid disorders also leads to hypertension [39]

HYPERTENSION TYPES AND TREATMENT

Hypertension can be broadly classified into following types:

Essential Hypertension: It is also referred to as primary hypertension. 90% of cases are of primary hypertension and the exact cause is not known [40,41].

Secondary Hypertension: This condition occurs due to:

Renal complications

Endocrinal changes

Miscellaneous factors [42,43]

In India 25% of urban population and 10 % of rural population suffer from hypertension. 70% of all hypertensive patients are stage I hypertension.12% of all hypertensive suffer from isolated systolic hypertension [44,45]. Other factors also increase the risk of hypertension such as Advancing Age, Postmenopausal condition in women, family history of cardiac disorders, sedentary lifestyle, high cholesterol diet habits [46], smoking, weight gain etc. The diagnosis of the disorder is very difficult as specific symptoms are unnoticeable in early stages. However slight dizziness, fatigue, blurred vision may be present.

The treatment regimen for hypertension includes lifestyle modification, pharmacological treatment, follow up and monitoring of the disease. Anti-hypertensive drugs are used to control the condition such as diuretics, β-blockers, calcium channel blockers, α-blockers, ACE- inhibitors, Angiotensin-II receptor blockers [47].

Treating hypertension can be a prolonged approach as it includes various things like diet changes, medication, and exercise. Some treatment methods are as follows:

The treatment for hypertension is designed in many ways considering the lifestyle of the patient along with medication that suits the patient.

Smoking increases the risk of hypertension so it must be avoided.

High stress can lead to emotional and psychological problems, including coronary artery disease and hypertension [48].

There are many approaches of complementary and alternative treatments for effectively treating hypertension. The treatment is majorly classified into non-pharmacological therapy and pharmacological therapy.

Multi-drug combinations are suggested by a physician to lower the hypertension levels in a patient.

CALCIUM CHANNEL BLOCKERS

Calcium Channel Blockers also known as calcium antagonists are the drugs that hinder the movement of calcium through calcium channels. These drugs are mainly acting on the large blood vessels that are blocked by stiffening in elderly people affected by hypertension. They act by reducing chest pain, prevents cerebral vasospasm.

Examples: Amlodipine, Aranidipine, Barnidipine etc

ACE INHIBITORS

These are the drugs that are used to relax and inhibit the ACE enzyme to prevent the formation of angiotensin II from angiotensin I. These drugs bind to the tissue and plasma proteins and imparts its action in reducing hypertension levels.
Examples: Captopril, Enalapril etc.

ANGIOTENSIN II RECEPTOR BLOCKERS (ARBS)

Angiotensin II receptor blockers (ARBs) have the same effects as ACE inhibitors. These drugs affect the angiotensin II which causes the narrowing of blood vessels and therefore the blood vessels are broadened which helps in easy flow of blood.

Example: Losartan, Temisartan etc

DIURETICS (WATER PILLS)

They are commonly known as water pills. They act by eliminating excess water and salt through urine. This process lowers the blood pressure and improves the functioning of heart.
Example: Esidrix, Zaroxolyn

BETA-BLOCKERS

Beta-blockers are drugs used to treat high blood pressure. They act by blocking the hormone epinephrine or adrenaline which in turn slows down the rate of hears beat.

OMEGA-3 FISH OIL SUPPLEMENTS

Omega-3 Fish oil supplements are the essential nutritive medication that greatly helps in reducing the hypertension levels and several cardiac disorders. Many studies show that consumption of omega 3 fish oils reduces the cardiovascular mortality by modifying the cellular metabolic functions, lowering lipid levels.There is another phase of hypertension which is prehypertension. It is a condition where body show elevated levels of blood pressure above normal but not to the extent of causing hypertension[49]. Prehypertension show no symptoms at the time of diagnosis. Normal symptoms like headaches, visual changes, fatigue can be observed sometimes.

EFFECT OF HYPERTENSION ON KIDNEY

High blood pressure can damage blood vessels present in the kidneys, effecting their functioning because hypertension results in flow of blood at high force throughout the body so the blood vessels stretch to allow easy blood flow thereby causing scars in kidneys.

EFFECT OF HYPERTENSION ON CARDIOVASCULAR SYSTEM

Hypertension causes an impact on cardiovascular system by causing ventricular hypertrophy, dysfunction and failure. This results in several cardiovascular diseases like arrythymias etc.

A potential etiology of hypertension has been linked to several factors like genetic makeup , adrenergic tone etc [50].

CONCLUSION

Regular health checkup, awareness of healthy lifestyle, and the use of better therapy helps to reduce the incidence of the disease. High blood pressure is a non-communicable disease which is normally customary in aged population. High blood pressure often coexists with an aberrant lipid profile and has been a plague globally, regardless of the development of the USA or community. Public cognizance approximately the function of hyperlipidemia in decreasing the morbidity performs a pivotal function.

REFERENCES

1. Wahiduzzaman M Serum lipid profile and its association with hypertension in Bangladesh. Vascular health and risk management 2014; 10: 327-332.
2. Dalal JJ, et al. LIPITENSION: Interplay between dyslipidemia and hypertension. Indian journal of endocrinology and metabolism 2012;16:240.
3. Adamu UG, et al. Serum lipid profile and correlates in newly presenting Nigerians with arterial hypertension. Vascular health and risk management 2013;9: 763.
4. Halperin RO, et al. Dyslipidemia and the risk of incident hypertension in men. Hypertension 2006;47: 45-50.
5. Hu H, et al. Hba1c, Blood Pressure, and Lipid Control in People with Diabetes: Japan Epidemiology Collaboration on Occupational Health Study. PLOS ONE 2016;11: e0159071.
6. Papagianni M and Tziomalos K.Cardiovascular effects of dipeptidyl peptidase-4 inhibitors. Hippokratia 2015; 19:195-199
7. Okamura H, et al. Clock genes and salt-sensitive hypertension: a new type of aldosterone-synthesizing enzyme controlled by the circadian clock and angiotensin II. Hypertension Research 2016.
8. Nash MS and Kressler J. Model Programs to Address Obesity and Cardiometabolic Disease: Interventions for Suboptimal Nutrition and Sedentary Lifestyles. Archives of Physical Medicine and Rehabilitation 2016.
9. Malan L and Malan NT. Emotional Stress as a Risk for Hypertension in Sub-Saharan Africans: Are We Ignoring the Odds? 2016.
10. Slentz CA, et al. Effects of exercise training alone vs a combined exercise and nutritional lifestyle intervention on glucose homeostasis in prediabetic individuals: a randomised controlled trial.Diabetologia 2016;1-11.
11. Ciocoiu M, et al. The beneficial effects on blood pressure, dyslipidemia and oxidative stress of Sambucus nigra extract associated with renin inhibitors. Pharmaceutical Biology 2016; 1-5.
12. Cai A, et al. Associations of systolic and diastolic blood pressure night-to-day ratios with atherosclerotic cardiovascular diseases. Hypertension Research 2016.
13. Long X, et al. Mortality, Recurrence, and Dependency Rates are Higher after Acute

Ischemic Stroke in Elderly Patients with Diabetes Compared to Younger Patients. Frontiers in Aging Neuroscience 2016; 8:142.
14. Ma X and Feng Y.Hypercholesterolemia Tunes Hematopoietic Stem/Progenitor Cells for Inflammation and Atherosclerosis. International Journal of Molecular Sciences 2016; 17: 1162.
15. Dong X, et al. Potential harmful correlation between homocysteine and low-density lipoprotein cholesterol in patients with hypothyroidism. Medicine 2016; 95: e4291.
16. Sabatine MS.Nurturing Nature-Exploring the Possible Role of Epigenetics in Dyslipidemia. JAMA Cardiology 2016;1: 36-37.
17. Hypovitaminosis D. Associated Cardiometabolic Risk in Women with PCOS 2016.
18. Hekmatdoost A, et al. Adherence to the Dietary Approaches to Stop Hypertension DASH and risk of Nonalcoholic Fatty Liver Disease. International Journal of Food Sciences and Nutrition 2016;1-6.
19. Lackland DT. Controlling Hypertension to Prevent Target Organ Damage: Perspectives from the World Hypertension League President.Ethnicity & Disease 2016;26: 267-270.
20. Torres J.Measure Up Pressure Down Provider Toolkit to Improve Hypertension Control. Health Promotion Practice 2016; 17:317-319.
21. Gaciong Z, et al. Population Effect of Differences in Cholesterol Guidelines in Eastern Europe and the United States 2016.
22. Rao G. Diagnosis, Epidemiology, and Management of Hypertension in Children. Pediatrics 2016;e20153616.
23. Walther D, et al. High blood pressure: prevalence and adherence to guidelines in a population-based cohort. Swiss medical weekly 2016;146: w14323.
24. AlSibai A and Qureshi AI. Management of Acute Hypertensive Response in Patients With Ischemic Stroke. The Neurohospitalist 2016;1941874416630029.
25. Nabeebaccus A, et al. Heart failure-potential new targets for therapy. British Medical Bulletin 2016.
26. Li M, et al. To Live Long, Eat Less Salt: Salt Intake Reduction Promotion and Hypertension Control in China. Health Care: Current Reviews 2016;4:169
27. Berezin AE. Is Elevated Circulating Galectin-3 Level A Predictor of Pulmonary Artery Hypertension Development and Progression? Clin Med Biochemistry Open Access 2016;2:114.
28. Li X, et al. Angiotensinogen M235T, β2 Adrenergic Receptor Arg16Gly and Aldosterone Synthase C-344T Gene Polymorphisms and Essential Hypertension among Han Population Living at High Altitude in China. J Hypertens 2016;5:222.
29. Mandapaka RT and Rachabathuni S. Prevalence of Hypertension and its Relationship between Dietary Salt Intake in Urban Population. J Community Med Health 2016;6:426.
30. Cifuentes D, et al. Targeting Hypertension to Manage Alzheimer's Disease: Rational and Promise. J Alzheimers Dis Parkinsonism 2016;6:228.
31. Feyh A, et al. Role of Dietary Components in Modulating Hypertension. J Clin Exp Cardiolog 2016;7:433.
32. Silva RP, et al. Who is the Patient with Suspected White Coat Hypertension? . J Clin Exp Cardiolog 2016;7:428.
33. Li H, Hypertension Management in Primary Care in China: Still a Long Way to Proceed. J Gen Practice 2016;4:238.
34. Huckabay L, et al. Hypertension in a Low-income and Homeless Community Sample. J Community Med Health 2016;6:399.
35. Sabyasachi Chatterjee. Alternative Herbal Medicine for Hypertension and Anxiety: Passiflora sp.-A short review 2016.
36. Kamal I, et al. Kidneys: The Victim Of Hypertension: Review. J Nephrol Ther 2015; 6:231.
37. Bos AJG, et al. Comparing the Prevalence and Drug Treatment Rates of Diabetes, Hypertension and Dyslipidemia between Japan and Brazil, using 2013 National Health Surveys. J Clin Diabetes Pract 2015;1:103.
38. Al-Hamdan NA. Isolated Systolic Hypertension among Adults in Saudi Arabia:

Prevalence, Risk Factors, Predictors and Treatment - Results of a National Survey. Epidemiology 2015;5:206.
39. Ashoor I. Pediatric Hypertension: A Primer for the Busy Primary Care Provider. J Nephrol Ther 2015;5:218.
40. Plácido R, et al. Predictors of Functional Capacity in Patients with Pulmonary Hypertension. J Pulm Respir Med 2015;5: 290.
41. Rajekar H . Complication of Cirrhosis Portal Hypertension: A Review. J Liver 2015;4:188.
42. Roever L. High-Sensitivity C-Reactive Protein, Hypertension and Stroke: Cause and Effect or Simple Association?. InternMed 2015; 5:e102.
43. Sun Y, et al. Pulmonary Arterial Hypertension from Hepatic HHT. InternMed 2015;5:109.
44. Jiangyan C, et al. Association among Systolic Blood Pressure Variation, Inflammation and Arterial Rigidity in Essential Hypertension. J Hypertens 2015;4:207.
45. Padda RS, et al. Angiotensin-(1-7: A Novel Peptide to Treat Hypertension and Nephropathy in Diabetes? J Diabetes Metab 2015;6:615.
46. Srinivasamurthy BC. Burden and Determinants of Hypertension in Rural Pondicherry, India. J Clin Med Genom 2015; 3:127.
47. Rodríguez ÁD, et al. Does Self-measurement of Blood Pressure (SMBP Contribute to Improve the Degree of Hypertension Control? Fam Med Med Sci Res 2015; 4:183.
48. Sansone P, et al. Postoperative Hypertension: Novel Opportunities in the Treatment of a Common Complication. J Hypertens 2015;4:202.
49. Ozdag Y, et al. An Assessment of the Awareness of Lifestyle Changes in Patients with Hypertension. Fam Med Med Sci Res 2015; 4: 178.
50. Gunes ARIK and Burcu Balam YAVUZ Hypertension in Older Adults-Geriatrician Point of View. J Gerontol Geriat Res 2014; 3:182.