

Miracle of Allicin, A Case Report

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Abstract

Hypertension is a chronic and end stage disease. The biomolecular mechanism involved in the pathogenesis can be interrupted for improving therapeutic approach and prognosis. Identifying the risk factors and causes of hypertension is essential to categorize into idiopathic and secondary hypertension. Garlic used since ancient time has drawn attention for deeper research towards its contribution to various health benefits. Its vital component allicin has played key role in beneficial effects of garlic.

Index terms— hypertension, atherosclerosis, angiotensin converting enzyme, allicin, alliin.

1 I. Case Report

5 years old male presented with history of indigestion since 3 months. More troublesome after having oily food stuff, fried items. Patient is a known case of type 2 diabetes mellitus since 8 years and hypertensive since 5 years. On treatment with T. Glimy 1 mg OD and T. Metformin SR 500 mg BD. T. Telmisartan 40mg OD and T. Amlodipine 2.5mg OD, T. Atorvastatin 20 mg HS, T. Aspirin 75mgHS.

Patient was examined thoroughly, basal BP measuring 158/92 mmHg and Per abdomen examination revealed tenderness in right hypochondriac region and epigastric region. Advised After the evaluation of biochemical investigations, the patient was advised to undergo ultrasound examination of abdomen and pelvis, which revealed Author: MBBS, MD (Biochemistry), Defense Institute of Advanced Technology. e-mail: madhuratksharma@gmail.com Grade 2 fatty liver, other solid organs didn't depict any abnormality.

Patient was advised to consume to garlic, to get the essentials of allicin from it. The concentration of allicin to be consumed would be mg, and dandelion along with milk thistle post dinner for 6 weeks. Intermittent basal blood pressure reading after 15 days of prophylactic remedy showed 148/90 mmHg. This is bound to take serial reading on three different days at 8 am on empty stomach without tea/ coffee intake, thus avoiding effects of caffeine, phytates and tannates on blood pressure. Basal reading on all three days showed systolic BP 146-150 mmHg and diastolic reading 86-90 mmHg. Hence his antihypertensive medications were changed to Telmisartan 40 mg once daily skipping T. amlodipine with regular follow up. At the end of one month blood pressure reading with similar consecutive reading on three different days revealed systolic BP ranging between 138-144 mmHg and diastolic BP ranging between 82mmHg to 88mmHg, once again the dosage of antihypertensive medication was reduced to 20mg of telmisartan.

At the end of 6 weeks, the biochemical investigations were repeated with more focused review on lipid profile. Astonishing results were received with following values LIPID PROFILE: Total cholesterol -202 mg% Triglycerides -153mg% LDL Cholesterol -92mg% HDL cholesterol-42mg% The patient was made to discontinue T. Aspirin, T. Telmisartan and T. Atorvastatin and continued to consume garlic essentials.

2 II. Garlic Essentials: A Boon to Healthy Heart

Being one of the most important organs in the body the heart is one of those organs that works nonstop. It circulates oxygen in the body and takes away the toxins produced, without which all other organs would shut down leading to death.

Atherosclerosis (in common term called as thickening and blocking of arteries) remains the major cause of death and premature disability in developed & developing countries. Current predictions estimate that year

45 2020 cardiovascular diseases, notably atherosclerosis, will become the leading global cause of total disease
46 burden. Atherosclerosis of the coronary arteries commonly causes myocardial infarction and angina pectoris.
47 Atherosclerosis of arteries supplying the central nervous system frequently provokes strokes and transient cerebral
48 ischemia. In the peripheral circulation, atherosclerosis causes intermittent claudication and gangrene, and
49 jeopardizes limb viability.

50 It is the narrowing or occlusion of the arteries by plaque, which consists of cholesterol, platelets, mono-
51 cyte/macrophages, calcium, aggregating proteins, and other substances. Morbidity of atherosclerosis-induced
52 coronary heart disease (CHD) gradually elevates annually due to the improvement of life standard and the change
53 of lifestyle in recent years. However, the mechanism of the onset and development of atherosclerotic lesions are not
54 completely understood until now. Many complicated factors, its interaction and interrelated biological processes
55 contribute to atherosclerosis. Among these, high plasma levels of low-density lipoprotein (LDL), especially its
56 oxidized form (ox-LDL), and activation of the renin-angiotensin system (RAS) are considered to be the key
57 influencing factor of the generation and development of atherosclerosis.

58 Growth of atherosclerotic plaques probably doesn't occur in a smooth, linear fashion, but rather discontin-
59 uously, with periods of quiescence punctuated by periods of rapid evolution. After generally prolonged 'silent'
60 period, atherosclerosis can manifest clinically. The clinical expressions of atherosclerosis may be chronic, as in
61 effort induced angina pectoris or of predictable and reproducible intermittent claudication.

62 Alternatively, a dramatic acute clinical event, such as myocardial infarction, a stroke, or sudden cardiac death
63 may first herald the presence of atherosclerosis. III. Scientific Role of Garlic in Maintaining Healthy Heart Garlic
64 (*Allium sativum*) is originated from central Asia and belongs to Alliaceae family. It is used as a flavoring agent.
65 In Egyptian codex 3500 years old document notifies that garlic was used in the treatment of heart disorders,
66 tumors, worm and snake bites etc. Majority of the garlic is composed by water around 65% followed by fructose,
67 sulphur, zinc, selenium and moderate amounts of Vitamin A, low levels of calcium, magnesium, iron, manganese.

68 3 MAJOR RISK FACTORS

69 Allicin is an organosulphur compound, obtained from garlic. The aroma of garlic when freshly crushed is because
70 of the content allicin released by the action of the enzyme allinase on the substrate alliin. Allicin is an oily
71 based yellowish liquid, which gives garlic its unique colour. Its biological activity can be attributed to both its
72 antioxidant activity and its reaction with thiol containing proteins. The content of garlic by whole weight to
73 its concentration of bioactive compound is 1:0.001. Allicin has a very short half life. Allinase is irreversibly
74 deactivated below pH 3; as such, allicin is generally not produced in the body from the consumption of fresh or
75 powdered garlic. Allicin is unstable, breaking down into inactive components at 23 0 C, thus cooking destroys
76 the bioactive component of garlic. Allicin exhibits lipid lowering, blood thinner, increases local circulation and
77 platelet inhibitor action thus preventing aggregation and clot formation. 3

78 4 IV. Mode of Action Allicin

79 Alliin + Allinase enzyme and Water = Allicin + Pyruvate+ Ammonia 4 The biological activity of allicin extracted
80 from fresh garlic is thought to be related to a combination of factors:

81 5 Antioxidant activity

82 Potent antioxidant with relevance to LDL oxidation and reduces peroxides accumulation in endothelial cells. As
83 oxidized LDL cholesterol is known to bind to specific receptors and stimulate the activation of numerous pro-
84 inflammatory changes in the vascular wall. 5 2. Enzymes are also protein, and contain SH (sulphydryl) group for
85 their biochemical interaction. Aliicin attacks the SH groups of protein interfering with their function. Cholesterol
86 is synthesized in the liver with the help of rate limiting enzyme HMG (beta-hydroxy-beta-methylglutaryl) Co A
87 reductase. Organosulphur content of allicin reduces the enzyme forming internal disulphide bond and inactivation
88 of thiol (-SH) group of enzymes like multienzyme complex of fatty acid synthesis. Thus contributing to lipid
89 lowering action. 6 Garlic, in an amount approximating one-half to one clove per day (600-900 mg), has been shown
90 to decrease total serum cholesterol levels by about 9% 3. Because of its organic nature, allicin rapidly penetrates
91 into the cell. 6 Volume XV Issue V Version I Elevated LDL levels promote atherogenesis likely involves oxidative
92 modification Cholesterol is necessary for the normal body process. It is the vital component of the cell membrane
93 and transports nutrients into the cell and waste products out of the cell. Cholesterol being the component blood
94 lipids: LDL, HDL, VLDL etc. Thus hypercholesterolemia causes metabolic derangement leading to oxidative
95 stress causing LDL oxidation and subsequent subendothelial accumulation forming foam cells.

96 The consistent benefit of LDL lowering by HMG CoA reductase inhibitors (eg. Atorvastatin) observed in risk
97 groups causes salutary effects on lipid profile and direct modulation of plaque biology apart from lipid lowering.
98 8,9,11

	Miracle of Allicin, A Case Report Hypertension and its Stages : 1
CATEGORY	SYSTOLIC BP (mmHg)
Normal	< 120
Pre hypertension	and 120-139
Hypertension stage I	or 140-159
Hypertension stage II	or ?160 or
V. Role of Garlic in Prevention and Treatment of Hypertension	
a) Improvements in vasodilatation due to maintenance	
Year of healthy endothelium secondary to prevention of accumulation of peroxides and other free radicals in	
2	
015	
b) Inhibition of angiotensin converting enzyme , thus reducing production of angiotensin II which is responsible for salt and water retention and vasoconstriction	
c) Decreasing platelet aggregation	
d) Lipid lowering effects by reducing hepatic cholesterol synthesis and fatty acid synthesis	
e) Prevents lipid peroxidation of oxidized erythrocytes. 7	
Abnormalities in plasma lipoproteins and derangement in lipid metabolism rank the most firmly established and best understood risk factors for	
D atherosclerosis.	
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Figure 1:

⁹⁹ 6 Other uses of Garlic

¹⁰⁰ It is beneficial in patients with chronic sinusitis , allergic rhinitis, hypertension in late pregnancy (preeclampsia),
¹⁰¹ travelers diarrhoea, flu, enlarged prostate (BPH-benign prostatic hyperplasia), building up immunity, prevention
¹⁰² and treatment of Colon CA, gastric CA, CA breast, CA prostate, CA lung. 12, ??? ¹

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