

# Hypertension and Garlic

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## Original paper

### SUMMARY

The aim of the study was to assess the efficiency of garlic in the treatment of mild and moderate arterial hypertension. Thirty patients with mild and moderate hypertension, age 41–64 years, 17 men and 13 women had taken three cloves, about 10 grams, of garlic daily, during one month period. Patients did not take any other antihypertensive medications. In case of 22 patients, 73.34%, we found a reduction of the average systolic blood pressure for 9.52%, and the average diastolic for 10.42%. We could not confirm the significant reduction in blood pressure with the garlic. Fresh garlic can be used only as an integral part of the diet as a factor in total strategy of hypertension treatment. There are reports that it has a significant effect on lowering serum lipids, on the platelet function, fibrinolysis, and the reduction of lipoprotein oxidation and anti atherosclerotic effect.

**Key words:** hypertension, garlic.

## 1. INTRODUCTION AND THEORY REVIEW

Increased blood pressure indicates a mechanical pressure of the blood on the inner surface of the blood vessel wall. It is defined as the force on the surface unit. It is expressed in millimeters of mercury column. According to physiology it is the pressure of one atmosphere used as zero, although atmosphere pressure is 76 mmHg. Thus if the patients have measured pressure of 120 mmHg it means that this pressure is for 120mm higher than atmospheric ( $120+760=880$  mm), but in practice is always expressed only as measured value. For the first time it was measured by the priest Stephan Hales in 1733, measured inside artery, on the cow. Scipione Riva Rocca in 1896 was the first to introduce method of noninvasive blood pressure measuring, and the measured was only systolic one by pulse palpation. Russian surgeon Nikolai Sergejevich Korotkov in 1905 introduced auscultation sphygmomanometer method of measuring both systolic and diastolic pressure (1).

At the mention of blood pressure we always think of arterial, which should be differentiated from the capillary and venous pressure. Systolic blood pressure is the amount of pressure that occurs in an artery at the time of systole, when ejection of the hearth impact volume of blood from the left ventricle in the circulation. This value of pressure corresponds to the mercury column when Korotkov sounds appear detected by auscultation in the elbow pit. Diastolic pressure represents the blood pressure in the artery at the time of diastole and the value of this match the numbers on

mercury column when Korotkov sounds change in quality or disappear (2).

According to the Sixth Report of the National Committee on prevention, detection, evaluation and treatment of high blood pressure from the U.S., normal blood pressure have people whose values are less than 130 mmHg of systolic and less than 85 mmHg for diastolic blood pressure. Severe hypertension is all pressures if systolic is higher than 180 and diastolic over than 110 mmHg (3).

Arterial hypertension is very often cardiovascular disease, both in highly developed countries of the world and in our country. According to 4<sup>th</sup> Report of National Committee on Prevention, Detection, Evaluation and treatment of high blood pressure of the United States, which was presented at the 36th Scientific meeting of the American Hearth Association on 11-14 November 1997 in Orlando, Florida, USA, and published in the November issue of Archives of Internal Medicine, and in our country in the Yugoslav Journal of Hypertension 1998 (4), on the basis of national studies on health and disorders, conducted on two occasions, between 1976-1998 and 1998-1991, the percentage of Americans who know they have high blood pressure is increased from 51% to 72%. Number of patients during the same period increased from 31% to 55%. According to research from Kaplan 1991 years (5), 52.5% of women at age 65-74 years and 65.4% of men at the same age, have hypertension.

Patients with hypertension have higher risk for other cardiovascular diseases, cerebrovascular and renovascular diseases. People with arterial hypertension have three times greater risk of the acute myocardial infarction and seven times greater risk of accruing cerebrovascular insult (5). Because of that, prevention, detection, and treatment of arterial hypertension should be a priority to all health professionals and health institutions.

There is a whole range of medicines for treatment of hypertension, from the first, atimalaria Pentacvine, to the latest drugs, receptor antagonists for angiotensine II (6). In the past 25 years a significant progress is achieved in detection, treatment and control of arterial hypertension. More and more people realize the seriousness of this disease and the need to follow doctor's advices on nonmedicamentous and hormonal treatment. Thanks to that mortality from coronary diseases is reduces by 50%, and from apoplexy for 57% (7).

General nonmedicamentous measures in the treatment of hypertension would be – reduction of increased body weight, reduced import of kitchen salt (below 5g per day), reduced input of animal fats, correction in interrupted metabolism of fats in the blood, reduced consumption of alcohol, smoking cessation, regular physical activity, achieving mental stability at home and work place (8).

In the struggle for a healthy diet of modern human being, it is necessary to point out the very useful properties of garlic. As the food garlic is used from 4000 years BC (9). Also it was always attributed with different taste but healing properties. The Garlic is described in the Old Testament, by ancient Romans and Greeks as used in the diet and in the treatment of various diseases. For true the Roman poet Horatio was very badly speak about garlic, while his friend Virgilie praised it(9). Old Egyptians adore it and the Greek Olympic team used it as protection from vampires and for self-defense. It was used by everyday people, soldiers and people from the highest social classes (10). Just to mention that some authors find that vampires are not afraid of the garlic (11).

Scientific interest in garlic begins in the second half of 19th century, when Louis Pasteur in 1858 determined that garlic destroys and prevents the growth of bacteria, and F. Damrau and E.A. Ferguson found that it can successfully treat 29 diseases (9). Today, garlic is used in raw natural form (cloves) or as its ingredients in the form of garlic powder or capsules, which are spare of it, by some bad smell.

In many scientific reviews it has been proven that garlic successfully corrects increased fats in the serum as well as total cholesterol, LDL cholesterol and triglycerides (12). It has been proved that the garlic have antioxidant effect (13,14), anti atherosclerotic effect (10, 15), anti aggregation effect (16, 17), anti inflammatory and antibacterial action (9, 10), anti diabetic effect (18, 9), antiviral (19, 9), and anti cancerogenic effect (20, 9, 10).

Numerous studies during last ten years confirm that garlic has a beneficial effect on the arterial hypertension. Mechanism on how the garlic lowers high blood pressure is not yet entirely clear, but there is different and convincing explanation. Noticed is the useful effect of garlic in the prevention and treatment of interrupted heart rhythm, especially in case of reperfusion (21, 22, 23).

Curative effect of the garlic is based on his brimstone compound. Dialil sulphide, a very important component

Gender	Age	Systolic	Diastolic	Systolic after h	Diastolic after Th	Notes
m	52	140	90	135	85	
m	49	140	80	130	80	
m	45	140	95	135	80	
f	53	150	95	140	80	
m	64	150	100	140	90	
m	51	150	105	140	90	
f	52	160	100	145	85	
m	45	160	100	145	90	
f	60	140	90	140	90	Equal
m	46	150	95	140	90	
m	60	130	80	130	80	Equal
f	41	140	100	135	85	
m	47	160	100	150	90	
m	58	140	75	140	75	Equal
f	43	150	105	140	90	
m	53	135	85	135	85	Equal
f	41	140	90	140	90	Equal
f	49	160	100	150	90	
m	45	140	90	140	90	Equal
f	63	150	85	145	80	
m	51	150	105	145	95	
f	48	140	85	140	80	
m	59	160	105	150	90	
f	56	150	95	150	95	Equal
f	58	155	100	140	90	
m	60	160	105	150	95	
m	55	150	90	150	90	Equal
m	62	160	105	145	95	
f	55	150	100	150	90	
f	50	155	105	140	95	

Table 1. Results of blood pressure measurement at the beginning of treatment with garlic and one month after the treatment

of garlic has been discovered in 1844 by Wertheim, and 1895 Samler identified its ingredients – dialil disulphide, dialil trisulphide and other sulphurous compound (9, 12, 18). There is more than 20 sulfur components in the garlic discovered. Artuir Stoll and Ewald Seebeck in 1984 from the extracted from the garlic crystals of amino acids, rich in sulfur, which they called aliin. When the garlic is chopped or squashed, enzyme allinase from the garlic turns to aliin of allicin, which is the chemical S-alila-L-cistein-sulphoxide, which is the main medicinal substance from the garlic, which gives it specific, an unpleasant smell (24). Natural allicin is unstable. It loses its quality during the first hours, and disappears after cooking for 20 minutes (9, 12). In undamaged garlic allicin is either not present or present in very small quantities.

Opinions about the beneficial effect of garlic in case of arterial hypertension are divided, although most authors consider that the garlic lowers high blood pressure. In China, the garlic is used since ancient times for treating hypertension, and the Japanese government has recognized it as a medicine. Association of German doctors also considered that the garlic can be successfully used in treatment of hypertension (25). Professional journal Lancet mentions the favorable effect of garlic (9), and it is confirmed by similar studies in Russia, Bulgaria and USA (9).

One group of authors give to the patients with mild hypertension in which had the average systolic blood pressure of 171 and diastolic 102 mmHg, garlic powder products (Kwai) 3x2 capsules of 100 mg daily, for 12 weeks and achieved a reduction in average systolic pressure from 171 to 152 and diastolic from 102 to 80 mmHg or systolic was decreased by 11% and diastolic by 13% (9).

Another group of authors was giving garlic in large quantities, 2400 mg daily and after 5 hours found significant decrease of systolic and diastolic blood pressure (26).

Authors which followed the results of eight studies (27), in which patients received during the four weeks garlic powder, found that the effect on systolic pressure was greater, which is evidenced by four studies, and that the effect on diastolic pressure was medium, although four of 8 followed studies found good effect on diastolic pressure.

The other 11 studies followed 415 patients (28) found that the reduction of systolic pressure was 7.7 mmHg higher than in the placebo group, and diastolic by 5 mm. Consuming fresh garlic for 6 months, in amount of 6.2 grams on daily basis led to the reduction of systolic pressure for 5.5% (29). Some authors found only a reduction in diastolic blood pressure after use of garlic preparations (17).

Some authors however, did not found reduction of blood pressure after use of garlic products, 3x300 mg of powder (Kwai) even after 12 weeks of therapy (30).

The mechanism by which garlic lowers blood pressure has not yet been completely explained. Previously it was thought that garlic destroys bacteria in the intestines, which were increasing blood pressure (9). According to some authors garlic makes conditional dilatation of blood vessels and thus acts hypotensive (31). According to this garlic effect on prostaglandins, which cause blood vessels dilatation. Garlic, increase the supply of blood in smaller blood vessels. Doctor S. Volf performed the experiment on 20 healthy people, he measured the diameter of conjunctiva arterioles, capillaries and the veins before and five hours after taking 800 mg of garlic powder. He found an increase in arterioles diameter by 4.2%, veins for the 5.9%, and no changes in capillaries (9). Tested was also the effect of garlic in the isolated aorta, with and without endothelium, by comparing it with the acetylcholine and L arginine effect. Garlic led to the relaxation of aorta which had removed endothelium as well as acetylcholine. Relaxing response of acetylcholine, L arginine, and garlic are not completely blocked by removing endothelium. Studies suggest that the vasorelaxation effect of garlic is in his hypotensive effect and help production of endothelium or muscle relaxing factors (31). According to some authors garlic leads to inhibition of adenosine diaminase in endothelium of blood vessels and in that manner have protective effect on blood vessels and hypotension (32). By others, garlic has a mild role as ACE inhibitor (22). Mild inhibition of AC enzymes is found in vitro and in vivo, which may contribute to cardio protective reduction in blood pressure.

A beneficial effect of garlic powder t on the peripheral arteries is found. Twelve weeks of garlic powder therapy in amount of 800 mg per day led to the extension of walk without pain, without claudications, for 46 meters, from 161

meters before treatment to 207 meters until appearance of pain after the treatment (17).

## 2. GOAL

The goal of the research was to see the impact of garlic on the high blood pressure, and to re-draw attention to high blood pressure, as one of the most common diseases of modern man.

## 3. MATERIAL AND METHODOLOGY

The study group was consisted of 30 patients with moderately high blood pressure, which does not require immediate start of antihypertensive hormonal therapy, and were treated on outpatient basis for cholesterol metabolism disorders. Group was consisted of 17 men and 13 women, age 41–64 years. The highest blood pressure in the group was 160/105 mmHg, and the lowest 135/85. Patients were not on any kind of antihypertensive therapy. For the correction of high cholesterol levels they were taking 3 normal cloves of garlic (about 10 gr), along with all meals. Their blood pressure is measured with mercury sphygmomanometer in laying down position, after 5 minutes of inactivity, at the beginning of treatment with garlic and after one month of treatment (Table 1).

## 4. RESULTS

Mean value of systolic blood pressure for all patients before the treatment was 148.5 mmHg and diastolic 95.16 mmHg. After a month of taking 3 cloves of garlic, in case of 22 patients (73.34%) we registered the reduction of systolic and diastolic blood pressure and in 8 cases the blood pressure was equal to the initial. Mean value of systolic blood pressure in patients which had later during treatment reduction of blood pressure was 151.36 mmHg before and after the treatment 136.95 mmHg, with reduction of 9.52%. Mean value of diastolic blood pressure in the same group before the treatment was 98.18 mmHg and after the treatment 87.95 mmHg, with reduction of 10.42%.

## 5. DISCUSSION

With 73.34% of patients that we followed and treat with garlic we found reduction in mean systolic blood pressure for 14.41% mmHg, or 9.52%, and diastolic for 10.2 mmHg or 10.42%.

Others authors have found weaker effect than we, and they found lowering of the systolic pressure of 7.7 mmHg and diastolic by 5.0 mmHg (28). Some authors have found a better effect, especially in lowering diastolic pressure (9). A number of authors only states that the effect existed, but does not state the measured effect.

From the above results it can be said that the garlic in most patients leads to reduction of blood pressure, but this reduction is minimal and can not be said that it could be the cure for the treatment of arterial hypertension, even mild one. However, thanks to overall useful effect of garlic (33), its cardio-protective effects, anti-arteriosclerotic effect, its very good effect on reduction of elevated cholesterol (12), we can say that the garlic is very good adjuvant remedy for prevention and treatment of high blood pressure, especially taking into account the fact that the garlic is used as a food

additive very much. Perhaps with mild hypertension its antihypertensive effect would be sufficient.

## 6. CONCLUSION

Garlic can not be regarded as a medicine for treatment of arterial hypertension, even mild one, although it reduces blood pressure in most patients. Garlic can be a very good diet factor in the prevention and treatment of hypertension.

Again, we want to draw attention to arterial hypertension, as very often, and serious illness of modern man, and to the need for a serious approach to its detection, and treatment and prevention.

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