INFLUENCE OF SOME ANTIHYPERTENSIVE DRUGS AND MEDICINAL PLANTS ON PATIENTS WITH ESSENTIAL HYPERTENSION

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ABSTRACT

Back ground: Hypertension is an important health problem in the world specially essential hypertension (EHT) is widely distributed which is a risk factor for cardiovascular and renal diseases. **Objective**: Assessment the effect of medicinal plants Garlic (G), *Nigella* sativa (NS), and adjustment their appropriate concentration in lowering the (EHT) and evaluate their effects on lipid profile and renal function. **Methods**: Sixty-seven patients with mild, moderate and severe (EHT) had treated by various antihypertensive drugs and medicinal plants (G,NS). Arterial blood pressure, serum lipid levels and renal functions were measured before and after they had treatment. **Results**: Administration of G,NS produced a significant lowering effect in the arterial blood pressure in patients with (EHT) when they were used alone or in combination with antihypertensive drugs. **Conclusion**: Garlic, *Nigella* sativa were effective, safe, cheaper and recommended for EHT.

Keywords: Essential hypertension, Garlic, *Nigella* sativa.

INTRODUCTION

Essential hypertension (EHT) is an important health problem in the world and accounting for 95% of all causes of high blood pressure. (17) and it is widely distributed in Iraq. Many factors that are responsible for EHT such as age (45), heredity (15) , race, smoking, coffee drinking (26) , stress, obesity (37) , toxic metals, alcohol intake (46) . EHT caused several complication that affected cardiovascular system (33) ,cerebrovascular (8), renal system (56) retinal (9) , large vessels (5) .

The efficacy of treatment EHT was tested in two well-know medicinal plants namely, Garlic (G) Nigella sativa (NS), which were proved to be effective in treatment of hypertensive patients.

METHODS

This study was carried out in Baghdad / the AL-Kadimyia Teaching Hospital (67) patients were involved in the study with the range of (50-52) years for (44) females and (23) males with mean body weight (80) kilograms and with moderate to severe blood pressure before therapy . The patients were alienated in eight groups treated by antihypertensive drugs (ramipril, felodipine, candesartan, valsartan and metobrolol) Table-1 which were used alone or in combination, duration of treatment are four weeks. Two medicinal plants Garlic (G). Nigella sativa (NS) were used daily in a dos of 5g of fresh G as tablets orally with meal, 1g of NS as capsule orally. These plants were used plus the above drugs related to each group which was used for another four weeks of treatment. The patients related to groups (7,8) have (5 patients) for each group suffered from mild EHT and treated by medicinal plant which used alone for duration of four weeks. Measurement of arterial blood pressure weekly. To determine the lipid profile (CH, TG, HDL, LDL, VLDL) and renal functions (blood urea (BU), creatinine (CR), uric acid (UA) ,Na,K,Ca) blood sample were taken from all patients who have no prior treatment after 12-14 hours fasting period and then every two weeks after onset of treatment for 4,8 weeks .

**Table 1: Showed the groups of hypertensive patients which
were treated orally by different regimens of drugs**

Group No.	No. of patients + different regimens of drugs
Group one	(14 patients) were treated by ramipril 5 mg.
Group two	(7 patients) were treated by fedodipine 5 mg.
Group three	(6 patients) were treated by candesrtan 8 mg.
Group four	(7 patients) were treated by metoprolol 50 mg.
Group five	(11 patients) were treated by combination of felodipine 5 mg + valsartan 80 mg.
Group six	(12 patients) were treated by combination of felodipine 10 mg + ramipril 10 mg. + metoprolol 50 mg.

Statistical Analysis

The Complete Randomized Design (CRD) ANOVA with Statistical Analysis System (SAS) was used to study the effects of period before treatment 1,2,3,4 weeks on difference traits. LSD test and Duncan's multiple range was used to comparative significant differences between the means(42) .

RESULTS

There was a significant reduction at p<0.01 in the arterial blood pressure levels of all patients who were treated with different regimens of drugs throughout the four weeks of treatment Table (2).

Table (3) show that there was a significant decrease in the arterial blood pressure levels (systolic and diastolic) at p<0.01, p<0.05 in groups treated by medicinal plants alone or in a combination with drugs during the period of treatment. Table (4) demonstrated that after treatment with different regimens of drugs there was a significant reduction in serum CH levels in group (3) while there was a significant elevation in serum CH levels in groups (1,2,5,6), serum TG and VLDL levels were significantly decrease in group (6) at some time a significant elevation of serum TG, VLDL, levels in groups (2,5), also a significant decrease in serum HDL levels as in groups (1,2,6) regarding the serum LDL level were significantly decrease as in group (3) and significantly increase in groups (1,5,6).

Antihypertensive therapy caused improvement in some renal functions as serum (BU, Cr, UA,Ca, K) with some groups throughout the period of treatment Table. (5)

A Combination of antihypertensive drugs and G as in groups (1,3,5,6) provided a significant improvements in some serum lipid profile levels Table (6).

 Also using G alone or in combination caused a significant decrease in serum Cr groups(1,6,7) and significant reduction in serum Na levels groups (1,3,6,7) after treatment Table (7).

 While using NS alone or in combination caused no improvement in serum lipid profile levels and renal functions in most groups throughout the treatment Table. (8)

**Table 2: The means of blood pressure levels (systolic and diastolic) mmHg in patients with
EHT throughout the four weeks of treatment by different regimens of drugs**

Group No.		Before treatment	After one week of treatment	After two weeks of treatment	After three weeks of treatment	After four weeks of treatment	LSD
Group one	Systolic	A 167.14 ± 3.23	B 152.14 ±6.72	C 146.07 ± 3.50	DC 144.29 ± 3.31	D 142.14± 3.51	**3.22
	Diastolic	A 107.00 ± 1.52	B 94.29 ± 3.31	C 90.86 ± 2.38	D 86.79 ± 1.97	E 83.79± 2.89	**1.88
Group two	Systolic	A 166.43 ± 6.45	A 158.86±10.61	B 149.00 ± 7.55	B 144.57 ± 4.24	B 145.71±3.45	**7.58
	Diastolic	A 106.43 ± 5.56	B 97.43 ± 5.68	C 92.14 ± 3.93	DC 87.57 ± 2.99	D 86.86± 2.61	**4.75
Group three	Systolic	A 169.17 ± 3.06	B 147.50 ± 5.24	B 144.17 ± 5.42	CB 144.00 ± 4.34	C 139.00± 2.97	**5.15
	Diastolic	A 105.83 ± 6.65	B 98.00 ± 2.45	CB 94.33 ± 2.94	CB 94.07±2.96	C 90.83± 3.76	**4.81
Group four	Systolic	A173.43 ± 2.70	B 157.57± 3.95	CB 156.57 ± 3.91	CD 153.43 ± 3.95	D 150.71± 3.45	**3.96
	Diastolic	A 109.29 ± 9.32	B 97.14 ± 10.75	B 93.14 ± 7.69	B91.43± 6.08	B 89.29± 5.35	**8.83
Group five	Systolic	A 177.67 ± 3.92	B 153.00 ± 3.10	B 151.18 ± 6.97	B 150.72 ± 6.20	B 149.90± 7.75	**5.02
	Diastolic	A 105.63 ± 6.97	B 95.09 ± 6.20	C 90.54 ± 4.65	C 89.81 ± 3.10	D 84.81± 3.87	**4.42
Group six	Systolic	A 221.58 ± 9.38	B 199.58 ± 6.82	C 161.16 ± 7.68	C 153.50 ± 11.09	C 154.58± 11.94	**7.84
	Diastolic	A128.33 ± 7.68	B 117.91 ±10.23	C 98.33 ± 4.26	C 97.08 ± 3.41	D 90.83± 5.97	**5.54

Table 3: The means of arterial blood pressure levels (systolic and diastolic) mmHg in patients with EHT throughout the four weeks of treatment by different regimens of drugs in groups (1,3,5,6) plus Garlic (G) or treatment by (G)alone in group (7).

Group No.		Before treatment plus (G)	After one week of treatment plus (G)	After two weeks of treatment plus (G)	After three weeks of treatment plus (G)	After four weeks of treatment plus (G)	LSD
Group one No.(7)	Systolic	A 143.71 ± 3.40	BA 140.00 ± 4.08	B 136.43± 4.75	C 129.29 ± 6.07	C 124.29 ± 4.50	5.07**
	Diastolic	A 84.29 ± 2.98	A 82.14 ± 2.52	A 82.00± 3.93	A 81.43 ± 3.78	B 74.00 ± 2.16	3.44**
Group three No.(6)	Systolic	A 139.00± 2.97	BA 137.50 ± 4.18	B 133.50± 3.94	C 128.50 ± 2.35	D 120.17 ± 3.19	4.03**
	Diastolic	A 90.83 ± 3.76	A 90.00 ± 3.16	A 89.17± 2.04	A 88.33 ± 4.08	B 77.67 ± 5.01	4.45**
Group five No.(6)	Systolic	A 149.83 ± 2.04	B 143.33 ± 4.08	C 138.33± 4.10	C 135.83 ± 4.92	D 129.33 ± 2.66	4.41**
	Diastolic	A 84.33 ± 3.83	A 84.50 ± 3.94	A 85.00 ± 5.48	A 83.83 ± 4.49	B 75.17 ± 5.34	5.55**
Group six No.(6)	Systolic	A 154.17 ± 17.72	A 144.17 ± 17.44	A 140.83± 19.08	A 138.33 ± 17.51	A 134.17 ± 16.36	21.9
	Diastolic	A 92.17 ± 6.77	A 91.67 ± 6.83	A 88.33± 2.58	B 82.50 ± 2.74	B 77.17 ± 3.19	5.75**
Group seven No.(5)	Systolic	A 145.00 ± 7.07	A 144.40 ± 6.97	BA 136.00± 8.94	BC 133.00 ± 7.58	C 125.00 ± 7.07	9.77**
	Diastolic	BA 94.00 ± 4.18	A 96.00 ± 2..34	B 92.00± 2.74	C 86.00± 2.24	C 84.00 ± 2.24	3.73**

Table 3: The means of arterial blood pressure levels (systolic and diastolic) mmHg in patients with EHT Throughout the four weeks of treatment by different regimens of drugs in groups (1,2,4,5,6) plus (NS) or treatment by (NS) alone in group (8).

Group No.		Before treatment Plus (NS)	After one week of treatment Plus (NS)	After two weeks of treatment Plus (NS)	After three weeks of treatment Plus(NS)	After four weeks of treatment Plus (NS)	LSD
Group one No.(7)	Systolic	A 139.86 ± 2.34	B 133.14± 4.18	C 128.57 ± 2.44	D 124.29 ± 3.45	D 121.43 ± 3.78	**3.62
	Diastolic	A 83.29 ± 2.93	A 82.14 ± 2.67	A 81.57± 2.15	B 75.71 ± 6.07	B 72.86 ± 3.93	**4.16
Group two No.(7)	Systolic	A 145.71 ± 3.45	B 140.00 ± 6.45	C 133.57 ± 3.78	D 127.43 ± 3.82	D 125.86 ± 4.49	**4.95
	Diastolic	A 86.86 ± 2.61	BA 84.29 ± 1.89	B 82.14 ±2.67	B 81.43 ± 2.44	C 75.29 ± 4.15	**3.12
Group four No.(7)	Systolic	A 150.71 ± 3.45	B 140.71 ± 4.50	CB 136.43 ± 6.27	CD 134.29 ± 5.35	D 130.86 ± 1.86	**4.97
	Diastolic	A 89.29 ± 5.31	A 87.14 ± 3.93	BA 86.43 ± 4.76	B 82.14 ± 3.93	C 74.71 ± 4.46	**4.93
Group five No.(6)	Systolic	A 150.00± 3.24	B 132.00 ± 10.95	B 132.00 ± 8.37	B 130.00 ± 7.07	B 130.00 ± 3.54	**9.57
	Diastolic	A 85.40 ± 3.65	A 86.00 ± 4.18	A 85.00 ± 5.00	A 83.00 ± 4.47	B 75.20 ± 3.56	**5.55
Group six No.(6)	Systolic	A 155.00 ± 18.97	A 150.83 ± 20.10	A 147.50 ± 15.41	A 143.33 ± 12.11	A 145.00 ± 13.78	19.45
	Diastolic	A 89.50 ± 10.27	BA 85.83 ± 6.65	BA 84.17 ± 6.65	BA 81.67 ± 5.16	B 79.50 ± 3.94	**8.17
Group eight No.(5)	Systolic	A 146.00 ± 10.84	A 150.00 ± 6.12	A 144.00 ± 4.18	BA142.0 ± 4.47	B 135.00 ± 6.12	*8.95
	Diastolic	A 95.00 ± 3.54	A 95.00 ± 3.54	A 95.00 ± 3.53	A 95.00 ± 3.54	B 75.00 ± 5.00	**5.11

**Table 4: The means of serum Lipid Cholesterol (CH), Triglyceride (TG),
High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL),
Very Low Density Lipoprotein (VLDL) mmol/L in patients with EHT throughout the
four weeks of treatment by different regimens of drugs**

Group No.		Before treatment	After two weeks of treatment	After four weeks of treatment	LSD
Group one	S.CH	A 5.71 ± 0.51	B 5.27 ± 0.41	A 5.84 ± 0.61	*0.39
	S.TG	A 1.94 ± 0.78	A 1.98 ± 0.58	A 1.96 ± 0.41	0.47
	S.HDL	B 1.38 ± 0.18	A 1.64 ± 0.30	C 1.07± 0.20	**0.18
	S.LDL	B 3.45 ± 0.58	C 2.73 ± 0.45	A 3.95 ± 0.40	**0.37
	S.VLDL	A 0.88 ± 0.36	A 0.90 ± 0.26	A 0.89 ± 0.19	0.21
Group two	S.CH	B 4.62 ± 0.47	A 5.84 ± 0.69	A 5.46 ± 0.73	**0.72
	S.TG	C 1.46 ± 0.08	B 1.78 ± 0.08	A 2.15 ± 0.13	**0.11
	S.HDL	A 1.27 ± 0.25	BA 1.13 ± 0.12	B 1.05 ± 0.09	*0.19
	S.LDL	B 2.68 ± 0.49	A 3.90 ± 0.75	BA 3.43 ± 0.81	*0.78
	S.VLDL	C 0.66 ± 0.04	B 0.81 ± 0.04	A 0.97 ± 0.06	**0.05
Group three	S.CH	A 6.35 ± 0.73	A 6.06 ± 0.78	B 5.00 ± 0.78	*0.94
	S.TG	A 3.51 ± 1.96	A 3.17 ± 1.95	A 2.01 ± 1.45	2.22
	S.HDL	A 1.35 ± 0.25	A 1.47 ± 0.09	A 1.50 ± 0.04	0.19
	S.LDL	A 3.42 ± 0.17	A 3.16 ± 0.48	B 2.60 ± 0.41	**0.47
	S.VLDL	A 1.59± 0.89	A 1.44 ± 0.89	A 0.91 ± 0.66	1.01
Group four	S.CH	A 5.35 ± 0.65	A 5.57 ± 0.82	A 5.86 ± 1.03	0.95
	S.TG	A 2.76 ± 0.55	A 2.21 ± 0.63	A 2.27 ± 0.80	0.75
	S.HDL	A1.51± 0.23	A 1.31 ± 0.23	A 1.30 ± 0.16	0.23
	S.LDL	A 2.59 ± 0.78	A 3.25 ± 0.85	A 3.53 ± 1.37	1.16
	S.VLVL	A 1.25± 0.25	A 1.00 ± 0.29	A 1.03 ± 0.36	0.34
Group five	S.CH	C 4.87 ± 0.02	A 6.76 ± 0.05	B 5.43 ± 0.12	**0.06
	S.TG	B 2.27 ± 0.01	B 2.25 ± 0.19	A 2.60 ± 0.08	**0.10
	S.HDL	A 1.24 ±0.08	B 1.14 ± 0.01	A 1.26 ± 0.02	**0.04
	S.LDL	C 2.51 ± 0.04	A 4.61 ± 0.15	B 2.95 ± 0.04	**0.08
	S.VLDL	B 1.03 ± 0.02	B 1.02 ± 0.02	A 1.18 ± 0.03	**0.02
Group six	S.CH	B 5.65 ± 0.04	B 5.43 ± 0.03	A 6.62 ± 0.85	**0.41
	S.TG	A 1.93 ± 0.03	C 1.46 ± 0.02	B 1.55 ± 0.02	**0.02
	S.HDL	A 1.86 ± 0.09	C 1.30± 0.09	B 1.45 ± 0.03	**0.06
	S.LDL	C 2.92 ± 0.07	B 3.47± 0.03	A 4.46 ± 0.34	**0.17
	S.VLDL	A 0.87 ± 0.02	B 0.67 ± 0.03	B 0.70 ± 0.09	**0.04

**Table 5: The means of serum (BU) mmol/L, (Cr) Mmol/L , (UA)Mmol/L levels in patients with
EHT throughout the four weeks of treatment by different regimens of drugs.**

Group No.		Before treatment	After two weeks of treatment	After four weeks of treatment	LSD
Group one	S.BU	BA 5.53 ± 0.88	B 5.10 ± 0.44	A 5.76 ± 0.55	*0.50
	S.Cr	A 110.43 ± 17.11	B 86.36± 20.59	A 102.07 ± 9.54	**12.55
	S.UA	A 391.14± 9.48	B 268.21± 52.36	B 297.71 ± 68.20	**38.20
Group two	S.BU	A 4.31 ± 0.41	B 3.72± 0.44	BA 3.97 ± 0.44	*0.48
	S.Cr	A 102.57 ± 7.44	BA 95.86 ± 8.41	B 90.00 ± 8.76	*9.23
	S.UA	BA 244.71 ± 9.86	A 253.00 ± 8.06	B 235.29 ± 9.09	**10.14
Group three	S.BU	A 5.32 ± 1.37	A 4.92 ± 1.35	A 4.61 ± 1.37	1.68
	S.Cr	A 77.67 ± 12.26	A 82.00 ± 10.37	A 86.17 ± 10.98	13.82
	S.UA	A 289.17 ± 13.32	A278.67 ± 35.62	A 275.83± 39.55	38.98
Group four	S.BU	B 5.34 ± 0.71	A 6.63 ±1.30	B 5.51 ± 0.76	*1.08
	S.Cr	A 92.43 ± 10.53	B 79.29 ± 6.65	B 70.43 ± 7.21	**9.33
	S.UA	B149.14± 18.18	A 247.43 ± 61.76	A223.43 ± 38.50	**48.64
Group five	S.BU	A 4.90 ± 0.08	A 4.85 ± 0.12	A 4.85 ± 0.15	0.10
	S.Cr	A 94.00 ± 4.65	B 88.36 ± 6.20	C 81.54 ± 5.42	**4.75
	S.UA	A 312.36± 10.07	A 306.63 ± 12.39	B 289.09 ± 8.52	**9.10
Group six	S.BU	A5.15± 0.13	B 4.35 ± 0.04	C 4.01 ± 0.01	**0.06
	S. Cr	A 85.00 ± 5.12	B 78.00 ± 5.12	B 76.00 ± 5.12	**4.25
	S.UA	B 236.08 ±13.64	B 243.66 ± 11.08	A 270.50 ± 8.53	**9.37

Table 5: The means of serum (Na,K,Ca) mmol/L levels in patients with EHT throughout the four weeks of treatment by different regimens of drugs

Group No.		Before treatment	After two weeks of treatment	After four weeks of treatment	LSD
Group one	S.Na	A 140.36 ± 1.51	A 140.64 ± 2.06	A 141.14 ± 1.75	1.29
	S.K	A 4.63 ± 0.32	A 4.64 ± 0.49	A 4.51 ± 0.33	0.29
	S.Ca	A 2.27 ± 0.37	A 2.14 ± 0.37	B 1.64 ± 0.16	**0.24
Group two	S.Na	A140.29 ± 0.95	A 139.57 ± 1.27	A 139.29 ± 0.76	1.14
	S.K	A 4.93 ± 0.32	B 4.59 ± 0.32	BA 4.77 ± 0.16	*0.31
	S.Ca	C 2.29 ± 0.13	B 2.58 ± 0.06	A 2.88 ± 0.08	**0.11
Group three	S.Na	A139.00 ± 0.15	A 138.76 ± 1.69	A 138.50 ± 1.75	2.05
	S.K	A 4.52 ± 0.15	A 4.46 ± 0.15	B 4.26 ± 0.15	*0.18
	S.Ca	A 2.21 ± 0.54	A 2.18 ± 0.54	A 2.11 ± 5.52	0.66
Group four	S.Na	A 142.57 ± 1.99	A 141.29 ± 1.11	A 141.43 ± 0.79	1.56
	S.K	B 4.83 ± 0.33	BA 5.10 ± 0.44	A 5.40 ± 0.55	*0.51
	S.Ca	A 2.70 ± 0.18	BA 2.62 ± 0.15	B 2.46 ± 0.13	*0.18
Group five	S.Na	A 140.25 ± 7.75	A 140.00 ± 6.97	A 140.36 ± 6.20	6.1
	S.k	A 4.65 ± 0.05	B 4.40 ± 0.08	C 4.35 ± 0.04	**0.05
	S.Ca	C 2.34 ± 0.03	A 2.95 ± 0.02	B 2.86 ± 0.02	**0.02
Group six	S.Na	A 139.50 ± 8.53	A 139.50 ± 7.68	A 139.50 ± 6.82	6.40
	S.k	A 4.40 ± 0.09	B 4.21 ± 0.18	A 4.35 ± 0.04	**0.10
	S.Ca	A 2.45 ± 0.04	A 2.50 ± 0.09	A 2.50 ± 0.09	0.06

Table 6: The means of serum Lipid Cholesterol (CH), Triglyceride (TG), High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL), Very Low Density Lipoprotein (VLDL) mmol/L in patients with EHT throughout the four weeks of treatment by different regimens of drugs in groups (1,3,5,6) plus (G) or treatment by (G) alone in group (7)

Group No.		Before treatment plus (G)	After two weeks of treatment plus (G)	After four weeks of treatment plus (G)	LSD
Group one No.(7)	S.CH	A 5.80 ± 0.56	BA 5.59± 0.56	B5.16 ± 0.55	*0.62
	S.TG	A 1.94 ± 0.59	A 1.73 ± 0.59	A 1.52 ± 0.51	0.63
	S.HDL	C 0.97 ± 0.09	B1.19 ± 0.19	A1.37 ±0.16	**0.17
	S.LDL	A 3.96 ± 0.48	A 3.61± 0.46	B3.10 ±0.43	**0.51
	S.VLDL	A 0.88 ± 0.27	A 0.78 ± 0.27	A 0.69 ±0.24	0.29
Group three No.(6)	S.CH	A 5.00 ± 0.78	A 4.83 ± 0.50	A 4.35 ± 0.46	0.82
	S.TG	A 2.01 ± 1.45	A 1.86 ± 1.42	A 1.57 ±0.97	1.60
	S.HDL	C 1.50 ± 0.04	B 1.60 ± 0.05	A 1.79 ±0.06	**0.66
	S.LDL	A 2.60 ± 0.41	BA2.40 ± 0.77	B1.85 ±0.48	**0.71
	S.VLDL	A 0.91 ± 0.66	A 0.84 ± 0.65	A 0.71± 0.44	0.73
Group five No.(6)	S.CH	A 5.37 ± 0.46	BA5.17± 0.37	B 4.72 ± 0.25	*0.46
	S.TG	A2.71 ± 0.91	A2.60 ± 0.85	A 2.29 ±0.83	1.07
	S.HDL	C1.24 ± 0.09	B1.41 ± 0.10	A 1.57 ±0.10	**0.12
	S.LDL	A 2.91 ± 0.63	BA 2.58± 0.61	B 2.11 ±0.53	*0.73
	S.VLDL	A 1.23 ± 0.41	A1.18 ±0.38	A 1.04 ±0.38	0.48
Group six No.(6)	S.CH	A 6.82 ± 0.64	A 6.62 ± 0.69	A6.11 ± 0.72	0.84
	S.TG	A 1.52 ± 0.23	BA1.35 ±0.20	B 1.11 ±0.24	*0.28
	S.HDL	A 1.53 ± 0.33	A 1.73 ±0.25	A1.87 ±0.38	0.40
	S.LDL	A4.60 ± 0.55	BA 4.28 ±0.62	B3.74 ±0.67	*0.76
	S.VLVL	A 0.69 ±0.11	BA0.61 ±0.09	B 0.50±0.11	*0.13
Group seven No.(5)	S.CH	A5.26 ±0.46	A5.00 ±0.48	A 4.86 ± 0.5	0.66
	S.TG	A 1.65 ± 0.50	A 1.40 ± 0.38	A 1.26 ±0.35	0.57
	S.HDL	B1.05 ±0.21	BA 1.28 ±0.16	A 1.41±0.15	*0.24
	S.LDL	A3.47 ±0.52	A 3.08 ±0.41	A2.88 ±0.44	0.63
	S.VLDL	A 0.75 ±0.23	A 0.63 ± 0.18	A0.57 ± 0.16	0.26

Table 7: The means of serum (BU) mmol/L, (Cr) Mmol/L , (UA)Mmol/L levels in patients with EHT throughout the four weeks of treatment by different regimens of drugs in groups (1,3,5,6) plus (G) or treatment with (G) alone in group (7).

Group No.		Before treatment plus (G)	After two weeks of treatment plus (G)	After four weeks of treatment plus (G)	LSD
Group one No.(7)	S.BU	A 5.74 ± 0.60	A 5.60 ± 0.55	A 5.50 ± 0.52	0.62
	S.Cr	A 101.57 ± 5.38	A 96.86 ± 4.91	B 90.99 ± 3.75	**5.31
	S.UA	A 307.71 ± 76.98	A 298.29 ± 76.58	A 290.43 ± 59.54	80.29
Group three No.(6)	S.BU	A 4.61 ± 1.37	A4.55 ± 1.40	A 4.44 ± 1.43	1.72
	S.Cr	A 86.17 ± 10.98	A 82.50 ± 10.41	A 78.00 ± 7.40	11.97
	S.UA	A 275.83 ± 39.55	A 267.33 ± 36.15	A 258.00± 35.25	45.57
Group five No.(6)	S.BU	A 4.86 ± 0.43	A 4.74 ± 0.43	A 4.60 ± 0.46	0.54
	S.Cr	A 78.67± 12.31	A 74.50 ± 10.33	A 69.33 ± 5.68	12.11
	S.UA	A 295.50 ± 52.44	A 291.50 ± 47.70	A 280.00 ±45.38	59.81
Group six No.(6)	S.BU	A 4.97 ± 0.62	A 4.90 ±0.63	A 4.79 ± 0.64	0.78
	S.Cr	A 77.17 ± 9.37	B 69.33 ± 5.16	B63.67 ±1.21	**7.65
	S.UA	A 275.33 ±34.90	A 269.17 ± 33.73	A 255.83 ± 24.60	38.70
Group seven No.(5)	S.BU	A 3.34 ± 0.57	A 3.22 ± 0.69	A 3.10 ±0.52	0.82
	S.Cr	A 75.40 ± 8.79	BA71.00 ± 7.97	B64.00 ±5.87	*10.53
	S.UA	A 168.80 ±5.26	BA 165.80 ± 4.82	B 159.40 ± 5.64	*7.24

Table 7: The means of serum (Na, K,Ca)mmol/L levels in patients with EHT throughout the four weeks of treatment by different regimens of drugs in groups (1,3,5,6) plus (G) or treatment with (G) alone in group (7)

Group No.		Before treatment plus (G)	After two weeks of treatment plus (G)	After four weeks of treatment plus (G)	LSD
Group one No.(7)	S.Na	A 141.43 ± 2.04	BA 139.57 ± 2.82	B 138.29 ± 2.06	*2.62
	S.K	A 4.59 ± 0.34	A 4.60 ± 0.71	A 4.68 ± 0.70	0.69
	S.Ca	A 1.66 ± 0.22	A 1.71 ± 0.24	A 1.79 ± 0.27	0.28
Group three No.(6)	S.Na	A 138.50 ± 1.76	BA 137.21 ± 1.85	B 135.74 ± 1.86	*2.24
	S.K	A 4.27 ± 0.15	A 4.31 ± 0.15	A 4.36 ± 0.14	0.18
	S.Ca	A 2.11 ± 0.52	A 2.10 ± 0.50	A 2.20 ± 0.56	0.65
Group five No.(6)	S.Na	A 141.00 ± 2.96	A 140.33 ± 1.96	A 138.25 ± 2.23	2.98
	S.K	A 4.22 ± 0.37	A 4.25 ± 0.41	A 4.30 ± 0.47	0.51
	S.Ca	A 2.93 ± 0.20	A 2.97 ± 0.22	A 3.00 ± 0.22	0.27
Group six No.(6)	S.Na	A 140.33 ± 1.03	B 139.02 ± 0.95	C 137.60 ± 0.96	**1.21
	S.K	A 4.10 ± 0.66	A 4.10 ± 0.59	A 4.22 ± 0.50	0.72
	S.Ca	A 2.58 ± 0.44	A 2.62 ± 0.39	A 2.70 ± 0.38	0.50
Group seven No.(5)	S.Na	A 143.20 ± 1.30	BA 142.40 ± 1.14	B 141.00 ± 1.01	*1.59
	S.K	A 4.40 ± 0.25	A 4.40 ± 0.12	A 4.50 ± 0.16	0.26
	S.Ca	A 2.45 ± 0.23	A 2.62 ± 0.22	A 2.50 ±0.20	0.30

Table 8: The means of serum Lipid Cholesterol (CH), Triglyceride (TG), High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL), Very Low Density Lipoprotein (VLDL) mmol/L in patients with EHT throughout the four weeks of treatment by different regimens of drugs in groups (1,2,4,5,6) plus (NS) or treatment by (NS) alone in group (8).

Group No.		Before treatment plus (NS)	After two weeks of treatment plus (NS)	After four weeks of treatment plus (NS)	LSD
Group one No.(7)	S.CH	A 6.02± 0.51	A 5.89± 0.53	A5.65 ± 0.53	0.54
	S.TG	A 1.99 ±0.15	BA 1.86 ±0.27	B1.69 ±0.15	*0.22
	S.HDL	A 1.18 ±0.23	A1.23 ±0.22	A 1.25±0.23	0.25
	S.LDL	A 3.95 ±0.34	A 3.82 ±0.40	A3.63 ±0.36	0.41
	S.VLDL	A 0.90 ±0.07	BA 0.84 ±0.12	B0.76 ±0.07	*0.10
Group two No.(7)	S.CH	A 5.46 ± 0.73	A 5.28± 0.68	A 5.08 ±0.83	0.84
	S.TG	A 2.15 ±0.13	BA 2.02 ±0.24	B1.84 ±0.22	*0.22
	S.HDL	A1.05 ±0.09	A1.08 ±0.13	A 1.11±0.18	0.15
	S.LDL	A 3.43 ±0.81	A 3.29 ±0.73	A3.13 ±0.96	0.94
	S.VLDL	A 0.97±0.06	BA 0.92 ±0.11	B0.84 ± 0.10	*0.10
Group four No.(7)	S.CH	A 5.86 ± 1.03	A 5.63± 0.98	A 5.50± 1.02	1.13
	S.TG	A 2.27 ± 0.80	A 2.21 ±0.75	A 1.97±0.68	0.83
	S.HDL	A 1.30 ± 0.16	A1.34 ±0.19	A 1.41±0.19	0.20
	S.LDL	A 3.53 ±1.37	A 3.28 ± 1.32	A 3.21±1.33	1.51
	S.VLDL	A 1.03 ±0.36	A 1.00 ±0.34	A 0.89± 0.31	0.38
Group five No.(5)	S.CH	A 5.44± 0.65	A 5.28± 0.61	A 5.11± 0.59	0.85
	S.TG	A 2.47 ±0.30	A 2.31±0.33	A2.21 ±0.30	0.43
	S.HDL	A 1.28 ±0.56	A 1.34 ±0.53	A 1.35 ±0.39	0.69
	S.LDL	A 3.03 ±1.13	A 2.89 ±1.08	A 2.75 ±0.85	1.42
	S.VLVL	A 1.12 ±0.14	A 1.05 ±0.15	A 1.00±0.14	0.20
Group six No.(6)	S.CH	A 6.42±0.85	A 6.27±0.84	A 6.04± 0.89	1.06
	S.TG	A 1.59±0.17	BA 1.45± 0.17	B1.32 ±0.19	**0.22
	S.HDL	A 1.37±0.45	A 1.40 ±0.45	A 1.44 ±0.50	0.58
	S.LDL	A 4.33±0.74	A 4.24 ± 0.73	A 4.00± 0.77	0.92
	S.VLDL	A 0.72±0.08	BA0.66± 0.08	B0.60 ± 0.09	*0.10
Group eight No.(5)	S.CH	A 5.46± 0.29	A 5.36 ±0.28	A 5.20 ± 0.29	0.39
	S.TG	A 1.70±0.63	A 1.57 ±0.60	A 1.30 ±0.38	0.75
	S.HDL	A1.46 ±0.27	A 1.50±0.26	A 1.55 ± 0.09	0.31
	S.LDL	A 3.27 ± 0.23	A 3.15 ± 0.22	A 3.06 ± 0.28	0.34
	S.VLDL	A 0.77±0.29	A 0.71± 0.27	A 0.59± 0.20	0.43

Table 8: The means of serum (BU) mmol/L, (Cr) Mmol/L , (UA)Mmol/L levels in patients with EHT throughout the four weeks of treatment by different regimens of drugs in groups (1,2,4,5,6) plus (NS) or treatment with (NS) alone in group (8)

Group No.		Before treatment plus (NS)	After two weeks of treatment plus (NS)	After four weeks of treatment plus (NS)	LSD
Group one No.(7)	S.BU	A 5.79 ± 0.55	A 5.50 ± 0.66	A 5.48 ± 0.41	0.62
	S.Cr	A 101.86 ± 13.56	A 99.57 ± 13.10	A 95.82 ± 12.78	14.77
	S.UA	A 287.71 ± 62.60	A 274.29 ±62.63	A 263.00 ± 60.33	69.47
Group tow No.(7)	S.BU	A 3.97 ± 0.44	A 3.83 ± 0.49	A 3.68 ± 0.51	0.54
	S.Cr	A 90.00 ± 8.76	A 88.14 ± 12.40	A 85.00 ± 12.01	12.55
	S.UA	A 235.29 ± 90.90	A 225.71 ± 9.88	B 210.00 ± 16.41	**13.74
Group four No.(7)	S.BU	A 5.51 ± 0.76	A 5.39 ± 0.79	A 5.20 ± 0.78	0.87
	S.Cr	A 70.43 ± 7.21	A 68.29 ± 5.38	A 65.43 ± 5.13	6.71
	S.UA	A 223.43 ± 38.50	A 211.43 ± 34.58	A 195.86 ±40.71	42.69
Group five No.(5)	S.BU	A 4.73 ± 0.51	A 4.61 ± 0.49	A4.43± 0.48	0.68
	S.Cr	A 85.00 ± 11.05	A83.40 ± 11.28	A80.00 ± 8.51	14.27
	S.UA	A 281.40 ±66.02	A 270.60 ± 66.36	A 256.60 ± 60.02	88.47
Group six No.(6)	S.BU	A 5.05 ± 0.35	A 4.84 ± 0.52	A 4.75±0.52	0.58
	S.Cr	A 74.83 ± 5.15	BA 70.17 ± 4.92	B 67.33 ± 3.20	*5.55
	S.UA	A 265.67 ±19.60	BA 247.33 ±18.06	A 241.50 ± 19.77	*23.58
Group eight No.(5)	S.BU	A 3.70 ± 0.89	A3.55 ± 0.87	A 3.40± 0.91	1.23
	S.Cr	A 67.60 ± 4.51	BA 65.20 ± 4.15	B 62.20±2.68	*5.32
	S.UA	A 228.80 ±75.59	A 212.60 ± 72.27	A201.00± 66.75	98.70

Table 8: The means of serum (Na,K,Ca) mmol/L levels in patients with EHT throughout the four weeks of treatment by different regimens of drugs in groups (1,2,4,5,6) plus (NS) or treatment with (NS) alone in group (8).

Group No.		Before treatment plus (NS)	After two weeks of treatment plus (NS)	After four weeks of treatment plus (NS)	LSD
Group one No.(7)	S.Na	A 141.14 ± 1.57	A 141.00 ± 1.59	A 140.84 ± 1.55	1.77
	S.K	A 4.43 ± 0.31	A 4.46 ± 0.39	A 4.54 ± 0.40	0.41
	S.Ca	A 1.62 ± 0.08	A 1.59± 0.11	A 1.54 ± 0.10	.0.11
Group two No.(7)	S.Na	A 139.29 ± 0.76	A139.11 ± 0.76	A 138.95 ± 0.82	0.88
	S.K	A 4.77 ± 0.16	A 4.85 ±0.10	A 4.90 ± 0.09	0.14
	S.Ca	A 2.88 ± 0.08	A 2.83 ± 0.08	A 2.79± 0.09	0.10
Group four No.(7)	S.Na	A 141.43 ± 0.79	A 141.30 ± 0.77	A 141.12 ± 0.98	0.95
	S.K	A 5.40 ± 0.55	A 5.40 ± 0.48	A 5.50 ± 0.49	0.57
	S.Ca	A 2.46 ± 0.13	A 2.42± 0.10	A 2.37± 0.10	0.13
Group five No.(5)	S.Na	A 139.60 ± 0.89	A 138.50 ± 0.74	A139.30 ±1.14	1.29
	S.K	A 4.52 ± 0.41	A 4.58 ± 0.40	A 4.65 ±0.83	0.80
	S.Ca	A 2.77 ±0.13	A 2.74 ± 0.14	A 2.69 ± 0.11	0.17
Group six No.(6)	S.Na	A 138.67 ± 3.88	A138.62± 1.58	A138.36 ±1.61	3.19
	S.K	A 4.61 ± 0.15	A 4.64 ± 0.14	A 4.70±0.23	0.22
	S.Ca	A 2.32 ±0.36	A 2.28± 0.33	A 2.33 ± 0.30	0.41
Group eight No.(5)	S.Na	A 142.06 ± 0.93	A 141.20 ± 0.84	A 141.00 ± 2.65	2.33
	S.k	B 4.40 ± 0.34	B 4.40 ± 0.21	A 5.00 ±0.14	**0.34
	S.Ca	A 2.48 ±0.25	A 2.44± 0.09	A 2.40 ± 0.13	0.23

DISCUSSION

In present study different regimens of antihypertensive drugs and medicinal plants were used to treat patients with moderate to severe EHT then reach to the normal level of BP. Ramipril induced a strong inhibition of plasma angiotensin converting enzyme activity (13) it was used and produced a significant reduction in BP group (1) may be increase of bradykinin concentration (20) .

Using felodipine to treat moderate EHT group (2) related to decrease the secretion of endothelin (ET), angiotens – Ang II and thromboxane A2 (TXA (2)) (43) .

Candesartan cilexetil used to treat patients with moderate EHT and caused reduce arterial blood pressure level after one week of treatment group (3) while (7) found reduction in the EHT after (2) weeks , this is due to the high compliance to the drug which is used , in the present study candesartan may suppress sympathetic nerve activity by inhibiting the rennin-angiotensin system in the brain on middle-aged elderly women with hypertension and menopausal like symptoms (23) may occur in women with mean of age 54 years group (3). A significant reduction in EHT in patients group (4) were treated by metoprolol tartarate and it may be related to increase the vagal activity and baroreflex sensitivity (53) . In the present study the target BP levels was not a chieved after few days of therapy with one or two drugs in groups (5,6) but after treatment by combination of drugs there was a greater reduction in BP as compared with monotherapy by improvement of antihypertensive drugs efficacy which result

from dual mechanistic action of component that targeting different effector mechanism (6) . Felodipine in high dose group (6) may exert antihypertensive action mineralcorticoid receptor, compete with aldosterone for binding and block aldosterone – induced coactivator recruitment to mineral – corticoid receptor (14) .Also combination of B-blocker with (CCBs) decrease hypertension by reducing cardiac output and suppressing renin with B-blocker.

CCBs reduce peripheral vascular resistance (19) . Reduction in BP level may be related to reduce of plasma leptin level and also to increase in adiponectin level (29) after administration of l0mg ramipril.

Using garlic alone or in combination with drugs groups (1,3,5,6,7) caused a significant reduction in EHT by it possible increase the production of nitric oxide (3) (35) , also by exert an indirect vasodilator effect by hydrogen sulphide synthesis which is a potent vasodilator (32) or garlic ability to inhibit angiotensin converting enzyme invitro (40) or reducting intracellular Na concentration and normalized blood pressure(4).NS produced a significant lowering in EHT levels after used alone or in combination with drugs to treat mild EHT group,may related to it's diuretic effect(57) or decrease the arterial blood pressure and heart rate (48) or its antioxidant activity (27) .

Table (4) after treatment with ramipril group (1) an significant elevation in serum LDL and decrease in HDL, this may differ from the results of (28) that ramipril caused decrease.in CH, LDL, HDL after one year and

ramipril alone didn't significantly change the lipoprotein and C- reactive protein, so our results due to the short period of treatment. After using felodipine group (2) there was a significant increase in serum CH, TG, VLDL and decrease in HDL this differ from results of (47),(38) which demonstrated that felodipine caused lowering in CH, TG and elevation in HDL after 10,8 weeks respectively, so our results may be related to the short period of treatment with felodipine. Treatment with candesartan in group (3) caused a significant decrease in serum CH similar to (44) study, also produced lowering to serum LDL due to reducing oxidized LDL level (36) this effect is related to inhibition of CD40, MMPs or inhibition of the expression of Lox -1 receptor for oxidized LDL on endothelial cell. (54) Treatment with metoprolol group (4) produced no significant changes in serum lipid these consistent with results by (16) when used metoprolol succinate for 12 weeks. Combination of felodipine, valsartan group (5) lead to a significant elevation in serum CH, LDL, TG, VLDL, this occurred due to the short duration of therapy by felodipine to neutralize the serum lipids and valsartan may have no possible beneficial effect on serum lipid because variation in the response of patients to improvement effect on lipid profile.

Treatment with a combination of felodipine, ramipril and metoprolol group (6) produced a significant elevation in serum CH, LDL, these results may occur due to the short period of treatment by CCBs, AngIs, to improve serum lipid may related to action of metoprolol (58),(10) , and inhibition of lecithin cholesterol acyltransferase enzyme (39) and decrease in hepatic LDL receptors (31) while reduction in serum TG, VLDL may due to the diet of patients . In our study G in group (7) caused no significant changes in lipid profile , may due to normal levels of lipid before treatment except LDL level that G is not clinically relevant lipid – lowering in normal – lipidaemic individuals (52) but an significant increase in serum HDL level. G in Combination with drugs provided a significant improvement in some serum lipid profile levels related to the synergistic action between G and drugs, so G has a sulfur containing compound including allicin the active substance (49) so garlic and its constituents inhibit the synthesis of CH and TG synthesis (59), (40) .

Garlic caused a significant increase in serum HDL levels so it appears to be an important protective factor against heart disease and stroke (25) . Using G in human increase resistance of LDL oxidation that suppress LDL oxidation it's a powerful mechanisms for antiatherosclerotic properties of G (30) . After

using NS alone or in combination with drugs there was no significant improvement in most serum lipid may be related to small dose of NS or short period of therapy that differ from the experimental studies of (34), (2) and (12) that NS lowered the lipid level and elevated HDL after treatment by 800mg / day orally for 4 weeks and 30mg / kg BW for 12-20 weeks.

Treatment with ramipril group (1) caused a significant reduction in serum UA, Ca levels which is related to the improvement of renal hemodynamic and internal glomerular dynamics of ACEIs, while using felodipine group.(2) produced a significant reduction in serum Cr level that consistent to the results of (18) . Using candesartan group.(3) produced non significant changes in serum UA level because it has no lowering effect on serum UA acid so exhibited no *cis* inhibitory effect on the uptake of UA by renal uric acid transporter which is an important factor controlling the serum uric acid level (51), (24) also non significant changes in serum BU, Cr, Na, Ca levels which were consistent to the results of (50) and candesartan caused a significant reduction in serum K level but (41) found that there was non significant reduction in K. Treatment with metoprolol group (4) produced a significant decrease in serum Cr and elevation in serum UA, these consistent to the study of (21) and produced increase in serum K level , this may be related to excessive potassium intake as in the study of (22) and reduce in serum Ca level. Combination of felodipine and valsartan group (5) caused a significant reduction in serum Cr, UA, K levels and elevation of serum Ca level these related to the effect of both drugs , while treatment with felodipine ramipril and metoprolol group (6) produced a significant decrease in serum BU, Cr, levels may be due to the action of drugs and elevation in serum UA may be related to the effect of drugs or the diet consumption by the patients.

Using G alone or in combination of drugs caused a significant decrease in serum Cr in groups (1, 6, 7) and BU, UA, group (7) G imply that could be beneficial to improve some renal function by its antioxidant properties and free radical scavenging abilities in various diseases (54), (11) . Also a significant reduction in serum Na level groups (1, 3, 6, 7) may related to synergistic effect between G and different drugs, indicating that G is useful in the management of electrolytes related disorder (1) , while treatment by NS alone or in combination caused non significant reduction in serum BU, Cr, UA, K,Na, Ca levels in most groups may related to small dose or short time of treatment or the normal values of these parameters.

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