

Anti-hypertensive effect of Gokshura (*Tribulus terrestris* Linn.) A clinical study

by

MURTHY A.R., Lecturer, Dept . of Dravyaguna, NIA, Jaipur 302 002, Rajasthan

*DUBEY S.D., Reader & Head, Dept. of Dravyaguna, IMS BHU, Varanasi-5, Uttar Pradesh

**TRIPATHI K., Prof. & Head. Of Medicine, IMS BHU, Varanasi-5, Uttar Pradesh

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INTRODUCTION

The clinical entity of Hypertension is not available as such in the classical literature of Ayurveda. However, according to the directions of charaka (C.Su 18/44-47) regarding the approach for the study of new diseases, various contemporary Ayurvedic scholars have been made efforts to find out the proper nomenclature, etiopathogenesis and treatment of the disease. Even though an ideal Ayurvedic treatment yet to be explored on the scientific parameters. Therefore, it is high time to ponder over the problem on a comparative basis of modern and ancient thoughts in order to search out it's rational therapy for eradication of the menace of human beings.

On the basis of above mentioned background we have made an effort to study the efficacy of indigenous plant diuretics in the treatment of Hypertension. For this purpose we have selected the most popular, easily available and safe plant i.e Gokshura (*Tribulus terrestris* Linn) belongs to the family Zygophyllaceae, on the basis of extensive review of all available ancient and modern literature regarding it's diuretic action. The experimental and clinical studies reported till now by various workers (Chopra RN, 1939, Gujerat ML, 1955, Karandikar GK, 1960, Singh RCP, 1971 and singh RG 1991) also strengthen the diuretic action of the drug.

MATERIAL AND METHODS

About 75 patients of either sex, different age groups having non-complicated, mild to moderate (140-179 mmHg. Systolic and 90-109 mmHg. Diastolic) essential hypertension with the symptoms of headache, giddiness, insomnia etc. were selected for the present study form the outpatient departments of Dravyaguna and Medicine of S.S Hospital , Institute of Medical sciences, Banaras Hindu University, varanasi. The pregnant women and hypertensives who are associated with other diseases were excluded form the study . all the patients were randomly divided into three groups (A,B&C) having 25 in each. Clinical evaluation was made on the basis of proper history, physical examination and laboratory investigations of the individuals according to the clinical proforma of the study. All the patients were advised to take their routine diets but extra ghee, eggs, salt, etc were restricted.

The test drug i.e whole plant and fruits of Gokshura (*Tribulus terrestris* Linn) in the form of ghanasatwa (solid water extract) as administered orally to the Group A&B respectively, at the dose of 3 gm/day in three divided doses in a soft gelatin capsule and Group C was treated as control in which

lactose IP was given with same dos, intervals etc, of the test drug. The duration of treatment was four weeks and the follow up of the patients was made at the end of every week for the assessment of improvement in general condition of the patients, parameters of the study and any side effects of the drug .

PARAMETERS

The results were observed on the basis of subjective and objective parameters before and after the therapy. The subjective parameters includes headache, giddiness, insomnia, swelling and other related symptoms of Hypertension and objective parameters includes systolic, diastolic and mean blood pressure, pulse rats, 24 hours urinary volume and serum cholesterol. The various data obtained from the it was analysed and tested for statistical significance.

OBSERVATION AND RESULTS

Table-1- showing Number of patients having different symptoms in various groups before and after one month of therapy.

Symptom	Group A		Group B		Group C	
	BT	AT	BT	AT	BT	AT
Headache	19	05	18	07	19	18
Giddiness	24	12	20	11	18	16
Insomnia	18	07	13	06	10	09
Palpitation	19	06	23	09	13	12
Swelling	22	07	20	30	14	11

In the present study majority number of patients were came with the symptoms of headache (56), giddiness (62), insomnia(41), Palpitation (55) and swelling (56). After one month of therapy the significant

improvement in clinical symptoms was observed in both the drug treated groups A&B than the control Group C, in which there was considerable change was observed (Table-1).

Table-2-showing mean reduction of systolic Blood pressure (mm Hg) before and after the Drug therapy.

Period	Mean Reduction of Systolic Blood Pressure (mm Hg)		
	Group A	Group B	Group C
Before Therapy	170.67 (±9.28)	171.69(±10.21)	153.96(±10.20)
After 1 week of therapy	163.37 (±7.21)	166.46(±7.26)	153.90(±8.27)
After 2 week of	159.48 (±8.93)	162.80(±6.79)	153.92(±6.23)

therapy			
After 3 week of therapy	155.28(±7.99)	158.34 (±8.21)	152.58(±9.58)
After 4 week of therapy	152.33(±10.28)	155.18(±9.27)	151.26(±12.51)

Table-3 Showing mean difference reduction of Diastolic Blood Pressure (mmHg) after one month of Therapy

	Group A	Group B	Group C
Mean diff	18.66	17.41	2.68
S.E	±2.98	±3.28	±0.17
T	6.26	5.32	-
p	<0.01	<0.02	NS

The gradual decrease of systolic blood pressure was observed in both the drug treated groups A and B from the end of the 1st weeks of therapy. While the mean difference decrease of systolic blood pressure among through treated groups was

significantly higher in Group A (18.66) than Group B(17.41). In comparison to control group both the drug treated groups having statistically significant effect in relation to reduction of systolic blood pressure (Tables 2&3).

Table-4- Showing Mean reduction of Diastolic Blood pressure before and after the Drug Therapy

Period	Mean reduction of Diastolic Blood Pressure (mmHg)		
	Group A	Group B	Group C
Before therapy	104.17 (±8.76)	104.97 (±9.76)	101.15(±9.27)
After 1 week of therapy	101.84 (±10.28)	102.41 (±8.29)	101.75(±8.21)
After 2 week of therapy	99.18 (±7.86)	101.18(±6.78)	101.70(±9.10)
After 3 week of therapy	98.46 (±9.95)	99.08(±10.23)	100.65 (±7.87)
After 4 week of therapy	95.78 (±8.97)	97.21(±8.23)	99.78 (±8.29)

Table-5 Showing mean difference reduction of Diastolic Blood Pressure (mmHg) after one month of Therapy

	Group A	Group B	Group C
Mean diff	9.18	7.97	1.97
S.E	±2.88	±2.10	±0.11
T	3.18	3.69	-
p	<0.01	<0.02	NS

Among the both drug treated groups there was a gradual decrease in diastolic blood pressure was also observed, which was started to found after one week of therapy. In control group there was no change in decrease of diastolic blood pressure upto the end of 2nd week and slight decrease was observed after the 3rd week of therapy which was statistically insignificant. The mean

difference reduction of diastolic blood pressure in both the drug treated groups A(<0.01) and B(<0.02) exhibited statistically significant effect than control (NS). However, in group A treated with the whole plant of Gokshura was showed some what prominent effect than group B treated with the fruits of Gokshura (Tables 4&5).

Table-6- Showing Mean reduction of mean Blood pressure (mm Hg) before and after the Drug Therapy

Period	Mean reduction of Mean Blood Pressure (mmHg)		
	Group A	Group B	Group C
Before therapy	124.39 (±12.81)	122.98 (±7.1)	116.34(±9.28)
After 1 week of therapy	121.11 (±9.13)	120.81 (±11.29)	116.35(±9.87)
After 2 week of therapy	120.04 (±9.71)	117.51(±8.37)	116.00(±7.29)
After 3 week of therapy	117.41 (±10.81)	116.01(±9.36)	115.67 (±8.67)
After 4 week of therapy	113.12 (±7.98)	112.48(±8.48)	115.28 (±10.28)

Table-7 Sowing mean difference reduction of Mean Blood Pressure (mmHg) after one month of Therapy

	Group A	Group B	Group C
Mean diff	11.81	11.01	1.04
S.E	±3.12	±2.89	±0.15
T	3.61	3.80	-
p	<0.01	<0.02	NS

When the reduction of mean blood pressure was considered there was no major difference in the results of Group A (11.81) and Group B (11.01) and in comparison to

control (NS) both he drug treated groups are having statistically effect. This observations reflects the ultimate hypotensive property of t test drug (Tables 6&7)

Table-8 Showing mean difference increase of 24 hour Urinary Volume (ml) after one month of Therapy

	Group A	Group B	Group C
Mean diff	201.61	210.45	12.25
S.E	±14.98	±13.25	±2.73
T	13.45	15.88	-
p	<0.02	<0.01	NS

The maximum mean difference increase of 24 hours urinary volume was observed in group B (210.45) than Group A (201.61, while comparing with the control Group

(12.25) both the Groups A and B were showed statistically significant effect (Table-8)

Table-9- Showing mean Difference Decrease of Pulse Rate (per minute) after one month of Therapy

	Group A	Group B	Group C
Mean diff	8.82	9.23	1.30
S.E	±2.23	±2.57	±0.41
T	3.45	3.59	-
p	<0.01	<0.01	NS

While considering the mean difference decrease of pulse rate the maximum effect was observed in Group B (9.23) than the

Group A (8.82). However, in comparison to control (NS) both the drug treated groups are statistically significant (Table-9).

Table-10- Showing mean Difference changes of serum cholesterol (mg%) after one month of Therapy

	Group A	Group B	Group C
Mean diff	10.23	9.49	2.14
S.E	±2.97	±2.86	±0.76
T	3.44	3.32	-
p	<0.02	<0.01	NS

The decrease of serum cholesterol was also observed in both the drug treated groups, Which were statistically significant in comparison to control group. However, the effect was more pronounced in Group A (10.23;<0.01) (Table-10).

The results of both subjective and objective parameters of the study reveals that both the whole plant and fruits of Gokshura (*Tribulus terrestris* Linn) in the form of ghanasatwa is having a significant action in reduction of clinical symptoms, systolic and diastolic blood pressure without any side effects on

DISCUSSION

the patients of mild to moderate essential hypertension. While considering clinical symptoms the maximum improvement of headache and giddiness in Group A and palpitation and swelling in Group B was observed. In case of objective parameters the maximum improvement in systolic, diastolic blood pressure and serum cholesterol in group A and 24 hours urinary volume and pulse rate in Group B was also observed. However, there was n significant variations in the overall results of Groups A and B. In Ayurveda, the descriptions regarding the properties and actions of Gokshura are generally depicted for the whole plant and it is also clear the various parts of a particular plant may have different panchamahabhautic configuration, constituents, properties and actions.

Hypertension is a disease of raktashrita and tridoshaja is a prime factor for production of the disease. The components of drug therapy f hypertension includes tridosha shamana, agni dipana, ama pachana, lekhana, rakta & sroto shodhana, hridaya, mutrala, rasayana and mastishka shamaka or medhya rasayana. Gokshura (*Tribulus terrestris* Linn) is having the properties of best diuretic and vatahara (C.Su 25/40), by virtue of these properties Gokshura may antagonize the etipathogenesis of hypertension by reducing the intra vascular volume, thus prevents

further accumulation of fluid and ultimately influence the other blood pressure controlling mechanisms like renal, cardiac, endocrine and central nervous system. It may removes all the excretory fluids by normalizing their proper flow within the body due to its vatanulomaka property. Apart form these the other properties of the drug like agnidipana (APN), srotoshodhana (RN), rasayana (C.S.Ci.II, 1/26), hridaya, vasodilator (Wang B, 1990) anti-cholesteremic (Arcasoy, 1998) adoptogenic and improves psycho-emotional imbalances (shaw BP, 1994) which may also help in the same.

CONCLUSION

Overall the Gokshura (*Tribulus terrestris* Linn.) is having a significant anti-hypertensive effect both systolic and diastolic without any side effects. Therefore this plant diuretic can be safely recommended for a longer period to the patients of mild to moderate hypertension mainly associated with fluid retention, of course it's role in severe hypertension may be as an adjuvant to the main therapy. However, further studies are suggestive to know the proper mechanism of action on large number of patients and other scientific parameters.

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