

To Study the Effect of Tribulus Terristris on Urinary PH, Uric Acid and Calcium as a Herbal Diuretic Agent

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ABSTRACT

Objective: To study the effect of tribulus terristris on urinary pH, uric acid and calcium as a herbal diuretic agent.

Study Design: Descriptive Study.

Place and Duration of Study: The study was conducted postgraduate Medical Institute (PGMI) Lahore and duration of study was two weeks.

Materials and Methods: Tribulus terristris extract (100 mg/kg body weight) was administered in rabbits. Rabbits are divided into two groups CT and Tt.

Results: There were significant alkalization of urine and significant reduction in urinary uric acid level and insignificant urinary calcium level observed.

Conclusion: It is concluded that alkalization and reduction of urinary uric acid by Tt would be help ful to reduce renal stone formation.

Key words: Control=CT, Tribulus terristris = Tt, Urinary pH, Urinary uric acid Urinary, Calcium=Ca++.

INTRODUCTION

T. terrestris is a tropical plant distributed throughout India and Sri Lanka. The entire plant and particularly, the fruits are extensively used in indigenous medicine. The roots and fruits are useful in improving appetite, urinary output, vesicular calculi and pruritus ani, alleviate burning sensation, reduce inflammation, cough, asthma, and cure renal diseases (kirtikar and Basu 1993).¹ T. terrestris is useful in the treatment of urolithiasis, dysurea, impotence or erectile dysfunction and kidney dysfunction, and has also shown antibacterial & antifungal activity and anti-inflammatory Activity (Al Bayati F.A 2008)².

Urinary stone formation is a common health problem in Pakistan and all forms of calculi are found in the kidney. Urolithiasis is more prevalent in males than females with the ratio 4:1 (Smith D.R. 1975)³. There are multiple factors involved in the stone formation. High intake of oxalate, carbohydrate, fat, purine dairy products protein and sodium chloride increase the incidence of stone formation (Smith D.R. 1975)³.

Thiazide and several non thiazide diuretics (Abraham P.A. & Smith C.L. 1984)⁴ and percutaneous nephrostomy and hemiacidrin (Dretler S.P. & Pfister R.C. 1984)⁵ are used to treat urolithiasis. High energy shock waves were used to disintegrate kidney stones. (Chaussy C., Bredel W. & Schmiedt E. 1980)⁶. Laser and pneumatic lithotripsy are safe and effective (Naqvi S.A.A. et al 1994)⁷. Banana stem extract has also been tested in rats (Poonguzhali P.K. & Chegu H. 1994)⁸ (Prasad K.V.S.R.G., et al 2007)⁹. Rice bran therapy has been tested to prevent the recurrence of urinary stone

diseases. (Ebisuno S. et al 1986)¹⁰ (Ohkawa T. & Morimoto S. 1987)¹¹.

This animal study was carried out to reveal the effects of indigenous herb Tt extract on urinary pH, Uric acid and calcium.

MATERIALS AND METHODS

Experimental animals: Sixteen rabbits of mixed breed were purchased locally and kept in the animal house of Postgraduate Medical Institute, Lahore for a week for acclimatization before starting the experiment. Twelve hours light and dark cycle was maintained. They were fed on grass, grain seasonal vegetables and water adlibitum. Animals were weighed for calculation of dosage of herb.

Study Duration: Study duration was two weeks.

Drug used: Tribulus terrestris extract (Aqueous).

Preparation of extract: Tribulus terrestris was purchased from local market with the help of experts of PCSIR, Lahore. The herb was made free of particulate impurities manually and spread in a stainless steel tray for drying (Sattar 1995)¹².

The extract was prepared by Maceration method (5gm in 100ml water). 100 gram air dried Tribulus terrestris was soaked in 2 liter (2000ml) of distilled water in a flask for 24 hours, shaking frequently during 6 hours and allowed to stand for 18 hours. Then filtrate was taken and fiber waste material was discarded. After that concentrated dry powder extract was obtained by evaporating the filtrate at 70°C⁰ in a scientific instrument/oven mod Eminex 854 SCHWABACH, Germany Din 12880 Kim Nem Tempt. 220 (Pharmacopoeia Anonymous 1993).¹³

The dry powder extract thus obtained was weighed with electronic balance which came out to be 8.5 gram/100 gram air dried tribulus terrestris and this dry powder of herb was dissolved in 1000ml D/W to get herbal preparation as 100 mg/ml for oral use. Herbal preparation was kept in refrigerator (Winfield A.J and Richards RME 1998)¹⁴.

Methodology: Sixteen rabbits of mixed breed were divided into two groups, control (CT) and Tribulus terrestris (Tt).

Group-I (Ct): Control groups (No medicine). They were kept under the same condition and handled like drug group animals.

Group-II (Tt): They received tribulus terrestris.

Dose: 100mg / kg body weight and administered orally twice daily (Said 1996).

Collection of sample: For urine collection rabbits were kept in special cages for twenty four hours on day 0, day 7 and day 14 completed on day 1, day 8, day 15.

Urine: Twenty four hours urine sample was collected in plastic bottles attached below the cages. The urine samples were taken three times during the study period i.e. on day 1, day 8 and day 15.

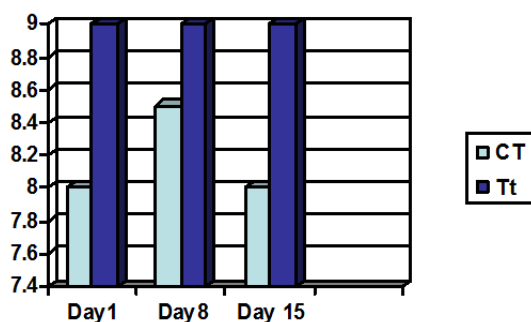
Urinary pH was measured (on day 1 day 8 and day 15) with the help of (Meditest Combi-3A).

RESULTS

After the administration of 100mg/kg body weight of Tt. for two weeks, the urinary pH was found to be statistically significant $P < 0.05$ throughout the period study. Reduction in urinary uric acid was also found to be statistically significant ($P < 0.05$) on day 1, day 8 and day 15 changes in urinary calcium levels were insignificant.

Table No.1: Effects of Tt on urine pH

Group	Day 1	Day 8	Day 15	Comparison of levels		
				Day 1-8	Day 8-15	Day 1-15
	Mean $\pm$ SEM			Significance		
Control	8.00 $\pm$.23	8.50 $\pm$.13	8.00 $\pm$.00	.121	.007	1.00
Tribulus terrestris	9.00 $\pm$.13	9.00 $\pm$.00	9.00 $\pm$.00	1.00	.000	1.00



Graph 1: Effect of Tt on Urine pH

Table No.2: Comparison of effects of Tt on Urine pH

Group	Comparison of levels		
	Day 1	Day 8	Day 15
	Significance		
Control Vs Tribulus terrestris	.005	.007	.000

Table No.3: Effects of Tt on urinary uric acid μ mol/lit

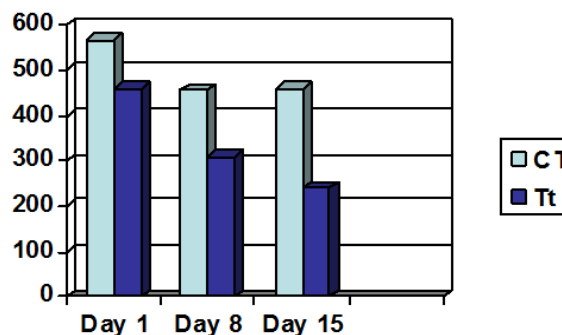
Group	Day 1	Day 8	Day 15	Comparison of levels		
				Day 1-8	Day 8-15	Day 1-15
	Mean $\pm$ SEM			Significance		
Control	567.00 $\pm$ 14.02	454.25 $\pm$ 11.78	458.00 $\pm$ 14.04	.001	.000	.000
Tribulus terrestris	458.00 $\pm$ 14.04	308.25 $\pm$ 11.85	239.00 $\pm$ 12.31	.000	.004	.000

Table No.4: Comparison of effects of Tt on urinary uric acid

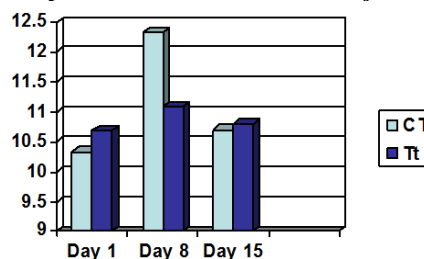
Group	Day 1	Day 8	Day 15
	Mean $\pm$ SEM		
	Significance		
Control Vs Tribulus terrestris	.000	.000	.035

Table No.5: Effects of Tt on urinary calcium mg/dl

Group	Day 1	Day 8	Day 15	Comparison of levels		
				Day 1-8	Day 8-15	Day 1-15
	Mean $\pm$ SEM			Significance		
Control	10.33 $\pm$.24	12.33 $\pm$.44	10.70 $\pm$.45	.002	.060	.544
Tribulus terrestris	10.68 $\pm$.63	11.08 $\pm$.63	10.80 $\pm$.44	.690	.729	.906



Graph 2: Effect of Tt on Urinary uric acid



Graph 3: Effect of Tt on Urinary Calcium

Table No.6: Comparison of effects of Tt on urinary calcium

Group	Day 1	Day 8	Day 15
	Mean $\pm$ SEM		
Control Vs Tribulus terrestris	.611	.243	.759

DISCUSSION

It produced alkalization of urine and our results are in agreement with satish et al 1996¹⁵. Study conducted in University Jaffna reviewed that urinary uric acid decreased after the administration of Tt for one week in normal individuals and diseased patients and results are consistent with our study conducted in PGMI Lahore. The results of our study regarding the urinary calcium are not consistent with vassanthi Arasartnam et al 2010¹⁶.

Tribulus terrestris acts as a herbal diuretic agent and hypovolumic associated effect may causes increased reabsorption of uric acid in nephron (proximal tubal) and further causes reduction of urinary uric acid level in urine (like thiazide diuretics). Urates stones are found in 15-20% patients with hyper uricosuria (Cameron J.S & Simmonds H.A 1987)¹⁷, (Coe F.L. & Raisin L. 1973)¹⁸. The increased urinary uric acid level is a cause for stone formation and therefore the Tt extract has a positive effect on the reduction of urinary stone formation while reducing uric acid level in urine, the extract also increased the urine volume would help in propelling renal stone and thereby reducing urate stone formation (Ali et al)¹⁹. Stone former must ensure plenty of fluid/water intake to maintain high urine volume which would keep the solutes well diluted (Christopher Haslett et al 2002)²⁰.

In our study urinary calcium level result shows statistically no significant reduction or increment therefore our result are inconsistent with Vasanthy Arasartnam et al 2010¹⁶. At alkaline pH Calcium salts are insoluble and precipitate calcium renal stone formation (Harlan E.I, David GW)²⁰. So that it need further investigation. While reduction in urinary calcium decreased renal stone formation. Thiazide diuretics, reduce calcium excretion variable in recurrent stone formers and patients with hypercalciuria (Christopher Haslett et al 2002)²⁰.

CONCLUSION

Tribulus Terrestris is a herbal diuretic agent. It changes the urinary pH towards alkalinity may decrease the incidence of crystal uria and renal stone formation (Satish el al 1996).

The result of our study shows reduction in urinary uric acid level and has a positive effect on the reduction of urinary stone formation. Because urate stone are formed in 15-20% patient, with hyperuricosuria (Cameron J.S & Simmonds H.A 1987, Coe F.L. & Raisin L. 1973).

There is no significant change in urinary calcium level. It means that Tt as a diuretic agent does not affect much more cation i.e. calcium. It needs further study to evaluate the effects on divalent cations.

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