

Clinical Research

Mootrala Karma of Kusha [*Imperata cylindrica* Beauv.] and Darbha [*Desmostachya bipinnata* Stapf.] - A comparative study

Niti T. Shah, Tarulata N. Pandya¹, Parameshwar P. Sharma², Bhupesh R. Patel³, Rabinarayan Acharya⁴

Lecturer, Department of Agad Tantra and Vyavahara Ayurveda, Parul Institute of Ayurveda, Limda, Vadodara, ¹Ex. Reader and Head, ²Ex. Professor and Head, ³Assitant Professor, ⁴Associate Professor, Department of Dravyaguna, Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar, Gujarat, India

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Abstract

Kusha (*Imperata cylindrica* Beauv.) and Darbha (*Desmostachya bipinnata* Stapf.) are enlisted among *Trinapanchamoola*, which is a well-known diuretic and are individually enumerated in the *Mootravirechaneeya Dashemani*. The article deals with the evaluation and comparison of the individual *Mootrala* (diuretic) action of the two drugs in healthy volunteers. In this study, 29 healthy volunteers were divided into three groups administered with *Darbha Moola Churna*, *Kusha Moola Churna*, and placebo in each group for 14 days. The volunteers were subjected to evaluation of diuretic activity by maintaining the daily total input-output charts during the course of the study. The volunteers were advised to consume a minimum 2 l of water daily. Results show that *Darbha* and *Kusha* led to a percentage increase in urine volume as compared to placebo group, but the result was statistically insignificant.

Key words: *Darbha*, *Desmostachya bipinnata*, diuretic, *Imperata cylindrica*, *Kusha*, *Mootrala*

Introduction

Modern therapeutics has a broad spectrum for diuretics. These drugs are not only very effective but also have side-effects.^[1] The *Mootrala* (diuretic) drugs of Ayurveda in addition to the diuretic effect, are supposed to have beneficial systemic actions. *Kusha* (*Imperata cylindrica* Beauv.) and *Darbha* (*Desmostachya bipinnata* Stapf.) have been quoted under the *Mootravirechaneeya Dashemani* (group of 10 diuretics) and *Mootravirechana Mahakashaya* (group of diuretics) by Acharya Charak^[2] and Vriddha Vagbhata,^[3] respectively. Both are the contents of *Trunapanchmoola* (group of 5 grass roots), a frequently used combination for treating scanty urination and burning micturition, etc.^[4] Acharya Sushruta has placed the two drugs in the *Veerataravadi Gana*, mainly indicated for the treatment of *Mootrakruchchhra*^[5] (Dysurea). Though both the drugs were highlighted for their diuretic activity, no scientific data is available to prove the claim. Hence, a clinical study was undertaken with the aim to evaluate and compare the

individual diuretic effect of *I. cylindrica* and *D. bipinnata*, the source plants of *Kusha* and *Darbha*, respectively.

Materials and Methods

Total of 29 volunteers, irrespective of their age, sex, and religion, were registered from the Out Patient Department of Dravyaguna, I.P.G.T. and R.A. Hospital, Jamnagar and divided into three groups having 10, 10, and 9 volunteers in Group A, B, and C, respectively.

Criteria for selection of volunteers

Healthy volunteers of 18-40 years age group were included in the study.

Exclusion criteria

1. Volunteers suffering from any kind of ailment like kidney disorders, *Ashmari*, etc., were excluded from the study.
2. Volunteers on any kind of medications or supplements or any other drugs were excluded from the study.

Pathological and bio-chemical investigations

1. Routine hematological investigations, Hb - Hemoglobin, TC (Total Count), DC (Differential Count), and platelet count.
2. Urine routine and microscopic examination.

Address for correspondence: Dr. Niti Tushar Shah, Lecturer, Department of Agad Tantra and Vyavahara Ayurved, Parul Institute of Ayurved, Limda, Waghodia, Vadodara - 391 760, Gujarat, India. E-mail: nititushar05@gmail.com

- Biochemical investigations (uric acid, blood urea, serum creatinine, serum sodium, serum potassium, serum chloride).

Plan of study

Collection and preparation of the drug

The rhizomatous roots of *I. cylindrica* Beauv. and *D. bipinnata* Stapf. were collected from the Killa Pardi region of Valsad district on 29/01/2008, personally, by the scholar and at, PGT-SFC cell, I.P.G.T. and R.A., Gujarat Ayurved University. The rhizomous were made into small pieces and shade dried and then pulverized to a fine powder of 80 mesh size in Pharmacy, Gujarat Ayurved University, Jamnagar.

Grouping and posology

- Group A: Root powder of *D. bipinnata* was given orally in a dose of 5 g twice daily for 14 days with water.
- Group B: Root powder of *I. cylindrica* was given orally in a dose of 5 g twice daily for 14 days with water.
- Group C (placebo): In this group, two capsules, each filled with 500 mg wheat flour, were given orally twice daily for 14 days with water.

Regimen

- Healthy volunteers were advised to follow normal diet excluding excessive salt intake, pickles, etc.
- Volunteers were advised not to suppress natural urges.
- Volunteers were advised to avoid tap water as it has high total diluted salt. Instead, they were provided if necessary with during the study.

Criteria for assessment

- The increase in urine output while maintaining the standard liquid intake of 2 or more liters per day. This was assessed on the basis of a specially designed input – output chart for day-to-day readings.
- The pathological and bio-chemical investigations were carried out at the beginning and at the end of the therapy.

Observation and Results

Both the test drug treated groups, on 7th day, show an apparent and statistically in-significant increase in the urine volume in comparison to the placebo group [Table 1]. Urine volume increased by 2.21% in Group A and 1.58% in Group B in comparison to Group C which showed 0.86% increase. The magnitude of the increase was higher in Group A.

Both the test drug treated groups, on 14th day, show an apparent and statistically insignificant increase in the urine volume in comparison to the placebo group [Table 2]. The volume of urine increased by 2.66% in Group A and 2.13% in Group B in comparison to Group C where in the increase was 0.65%. The magnitude of the increase was higher in Group A.

Compared to control group, Group A showed a decrease in the serum sodium level by 0.14%. Whereas in comparison to control group, Group B showed an increase in serum sodium level by 0.57%, which was found to be statistically insignificant [Table 3].

Compared to control group, Group A showed an increase in the

serum potassium level by 0.23%, whereas Group B showed a decrease in serum potassium level by 1.16%, which were found to be statistically insignificant [Table 4].

As compared to control group, Group A and Group B showed a decrease in the serum sodium chloride level by 0.10% each. Both the results were found to be statistically insignificant [Table 5].

It was found that on administration of test drugs, urine volume increased by 2.72% in Group A and 2.17% in Group B, whereas on administration of placebo to Group C urine volume increased by 0.65% [Table 6].

Table 1: Comparative effect of test drugs with control group on volume of urine on 7th day

Group	Mean±SEM	% Change	't'	'P'
Group A	24.00±02.33	2.21 ↑	0.590	>0.5
Group B	21.00±06.23	1.58 ↑	0.531	>0.5
Group C	08.89±06.76	0.86 ↑	-	-

↑: Increase, SEM: Standard Error of Mean

Table 2: Comparative effect of test drugs with control group on volume of urine after 14th day

Group	Mean±SEM	% Change	't'	'P'
Group A	29.00±03.05	2.66 ↑	0.750	>0.5
Group B	23.00±03.67	2.13 ↑	0.682	>0.5
Group C	06.67±06.24	0.65 ↑	-	-

↑: Increase, SEM: Standard Error of Mean

Table 3: Comparative effect of test drugs with control group on serum sodium

Group	Mean±SEM	% Change	't'	'P'
Group A	0.20±0.44	0.14 ↓	-	-
Group B	-0.80±0.65	0.57 ↑	0.699	>0.5
Group C	-0.22±0.95	0.16 ↑	-	-

↓: Decrease, ↑: Increase, SEM: Standard Error of Mean

Table 4: Comparative effect of test drugs with control group on serum potassium

Group	Mean±SEM	% Change	't'	'P'
Group A	-0.01±0.02	0.23 ↑	0.429	>0.5
Group B	-0.05±0.04	1.16 ↓	0.186	>0.5
Group C	-0.02±0.05	0.51 ↑	-	-

↑: Increase, ↓: Decrease, SEM: Standard Error of Mean

Table 5: Comparative effect of test drugs with control group on serum chloride

Group	Mean±SEM	% Change	't'	'P'
Group A	0.10±0.35	0.10 ↓	0.702	>0.5
Group B	0.10±0.33	0.10 ↓	0.764	>0.5
Group C	0.22±0.22	0.22 ↓	-	-

↓: Decrease, SEM: Standard Error of Mean

Table 6: Overall effect of placebo and test drugs on urine volume (in ml)

Group	n	BT	AT	% Change
Group A	10	1063.00±086.86	1092±85.66	2.72 ↑
Group B	10	1058.00±068.86	1081±68.46	2.17 ↑
Group C	9	1023.33±116.15	1030±114.53	0.65 ↑

↑ = Increase, BT = Before Treatment, AT = After Treatment

Table 7: History wise distribution of 29 volunteers

Personal history	No	%
Daily liquid intake (2-2.5 l)	20	66.67
Urinary frequency (4-5)	14	46.67

Discussion

The study was conducted during the temperate seasons, i.e. during the month of November 2008 and February 2009, to minimize the effect of temperature changes on body fluids. Liquid intake directly affects the urine output.^[6] Fewer intakes cause concentrated and less amount of urine.^[6] It was seen that maximum volunteers took a sufficient amount of liquid. At the start of the study, all the volunteers were instructed to consume at least 2 l of water daily. Maximum volunteers had urinary frequency of 4-5 times in 24 h (46.67%) [Table 7]. The frequency of urine output was within the normal range as the volunteers were advised to take at least 2 l of water daily.

Urine examination

In Group A, albumin was positive and pus cells were seen before starting the therapy. This became negative after the completion of the therapy. This indicates that the drug *D. bipinnata* might be effective in urinary tract infections, as *Darbha* has been quoted as *Mootrakruchchrahara* by most of the *Acharyas*.^[7-9] In Group B, pus cells did not become negative totally but decreased at the end of the study, which indicates that, the drug *I. cylindrica* may be effective on UTI but less as compared to *D. bipinnata*. Albumin and pus cells persisted in the placebo-treated group.

Biochemical examination

Serum sodium decreased in Group A while it increased in Group B as compared to control group but these changes were within the normal range and was not significant statistically. Serum potassium level increased in Group A while it decreased in Group B as compared to control group. However, the changes in serum potassium level were within the normal range and were not significant statistically. As compared to control group, there was a decrease in the serum chloride levels but this change

was within the normal range and was found to be statistically insignificant. The study was carried out on healthy volunteers; hence, much variation could not be seen in these parameters.

Overall effect of therapy

As compared to placebo, Group A showed 2.72% increase while Group B showed 2.17% increase in volume of urine. The increase in the placebo group was 0.65%. Thus, the data reveals that the two test drugs are more effective than the control group though statistically insignificant result was seen though a marginally better result was seen in Group A in comparison to Group B.

Conclusion

Darbha (*D. bipinnata*) and *Kusha* (*I. cylindrica*) show an increase in urine volume on percentage basis, but the effect was not found statistically significant. The two plants did not cause any adverse effect on bio-chemical values. Decrease in the level of urine albumin and pus cells was observed in both the drugs.

Suggestion

The study was carried out on healthy volunteers. Further study may be done on disease conditions such as UTI, Kidney stone, etc.

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हिन्दी सारांश

कुश एवं दर्भ का मूत्रल कर्म निर्धारणार्थ तुलनात्मक अध्ययन

नीति तुषार शाह, तरुलता एन. पंड्या, परमेश्वर पी. शर्मा, भूपेश आर. पटेल, रबिनारायण आचार्य

कुश एवं दर्भ, तृणपञ्चमूल की औषधियाँ हैं तथा मूत्रविरेचनीय दशेमानि में भी इनका उल्लेख है। तृणपञ्चमूल का उपयोग मूत्रल के रूप में किया जाता है। यहाँ पर इन दोनों औषधियों का स्वस्थ स्वेच्छुक व्यक्तियों पर मूत्रल कर्म का तुलनात्मक अध्ययन किया गया। इस अध्ययन में कुल २९ स्वस्थ स्वेच्छुक व्यक्तियों को तीन वर्गों में विभक्त किया गया, जिन्हें (१) दर्भमूल चूर्ण (५ ग्राम), (२) कुशमूल चूर्ण (५ ग्राम) एवं (३) प्लेसिबो (२ कैप्सुल-५०० मि. ग्राम), १४ दिनों तक दिन में दो बार दिया गया। स्वेच्छुक व्यक्तियों को प्रतिदिन कम से कम दो लिटर पानी का सेवन करने के लिए कहा गया। मूत्रल कर्म का अध्ययन प्रतिदिन निष्कासित मूत्र की मात्रा एवं कुल सेवित द्रव्य पदार्थों की तालिका के द्वारा किया गया। परिणाम में देखा गया कि दर्भ और कुश, प्लेसिबो की तुलना में मूत्रल कर्म दिखाते हैं परन्तु सांख्यिकीय दृष्टि से यह प्रभावी नहीं था। दोनों औषधियों में से दर्भ में अधिक मूत्रल कर्म देखा गया।

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