



COMPARATIVE CLINICAL STUDY ON KSHAR OF SWERTIA CHIRAYATA ROXB. EX FLEM. BUCH AND SWERTIA ANGUSTIFOLIA BUCH-HAM. EX D.DON, PROCESSED IN MAHISHMOOTRA WITH SPECIAL REFERENCE TO AGNIDEEPAN ACTIVITY

Sabita Sapkota ^{1*}, Mohan Lal Jaiswal ²

¹ PG Scholar, Department of Dravyaguna Vigyana, National Institute of Ayurveda, Jaipur, Rajasthan, India

² Professor, Department of Dravyaguna Vigyana, National Institute of Ayurveda, Jaipur, Rajasthan, India

*Corresponding Author Email: sapkotasabita1988@gmail.com

DOI: 10.7897/2277-4572.086159

Received on: 07/08/19 Revised on: 15/09/19 Accepted on: 30/09/19

ABSTRACT

The aim of this study is to observe and compare the agnivaradak activity of Kshar of *Swertia chirayata* roxb. Ex Flem. And *Swertia angustifolia* buch-ham. ExD. Don processed in Mahishmootra. For this study, 40 clinically diagnosed and registered patient of agnimandhya were divided randomly into 2 groups A and B, each group consisted of 20 patients. Group A patients were given kshar of *Swertia chirayata* roxb. Ex Flem. 500 mg /day in two divided doses for 21 days. Group B patients were given kshar of *Swertia angustifolia* buch-ham. ExD. Don 500 mg/day in two divided doses for 21days. Follow-up of patient was done on 10th and after 21st days of treatment. Improvement in the symptoms if any and other effects were noted down. Laboratory investigations were repeated in Group A and Group B after completion of the treatment. Observations were made according to the standard Ayurveda parameters selected and findings were recorded in well-designed proforma (Complete history of present illness, family history and past history relevant to the complaints, patient's age, socio-economic status and hygienic conditions, nature of work, diet, Dashavidhpariksha, etc. in detail with their relative significances concerning the selected disease). Subjective parameters (Self scoring method) taken in the study were Abhyavaharana Shakti and Jarana Shakti. Under Abhyavaharana Shakti Matra and Avritti were taken. Under Jarana Shakti Laghuta, Klamaparigamana, Ksudha, Udgara Suddhi and Vegotsarga. Objective parameters taken were Stool R/E, LFT. Relief in overall signs and symptoms were observed slight better in Group B as compared to Group A.

Keywords: Agnivaradak activity, kshar, mahishmootra, Abhyavaharana Shakti, Jarana Shakti.

INTRODUCTION

Ayurveda is ancient science of life aiming not only on the curative aspect but also on the preventive aspect of disease. The balanced state of Dosh, Agni, Dhatu and mala are the basic elements of a healthy and happy individual.¹ Ayurveda views the health of an individual as the proper functioning of Agni. Acharya Charak has explained importance of Agni as: Santeagnaumriyate, yuktechiram jivatyanaamayah.² Acharya Charak has mentioned four types of Jatharagni-Vyapara, depending on the influence of the Tridosha on Agni.³ In a Vatala individual Agni Prakara is Visama. In a Pittala individual Agni Prakara is Tikсна. In a Slesma individual Agni Prakara is Manda and in a state of equilibrium of Tridosha, there is Samagni and such an individual is known to be of Sama Prakriti. Hence, Samagni is the standard, while Tikснаgni, Mandagni and Visamagni are relatively various conditions of the Agni which within certain limit or range of variation that does not cause any discomfort; whereas, Agnimandhya is the pathological condition of inhibited Agni. Manda Agni leads to the manifestation of all the types of diseases.⁴ Kiraatatikta in Ayurveda is accepted as *Swertia chirayata* roxb. ExFlem. Buch and its family Gentianaceae and is available in Hilly and Himalayan belts of India and Nepal. It is commonly called Chirayata and in Nepali it is called Chiraito. Bhunimba is its Sanskrit synonym. Charak Samhita kept it under Tiktaskandha.⁵ Sushrut Samhita kept it under Aaragvadhadi gana.⁶ It is famous for its various medicinal properties. It is widely used in conditions like Jwar, Gulma, Grahani, Shool, Aruchi, Kaamala, etc. Acharya Charak has explained the Agnivaradhak property of Bhunimbadi Kshar as "Bhunimbamrohinimiktitaampatolamnimbaparpatam,

dahenmaahishamutrenakshaar yesoagnivardhanah."⁷ *Swertia angustifolia* buch-ham. ExD. Don is one of the plants of genus *Swertia* also available in Hilly and Himalayan belts of India and Nepal. It is called bhalechiraito locally in Nepal. It is less bitter in taste than *Swertia chirayata* roxb. Ex Flem. So, it is also called as mithachirayata. It is widely available in the market in the name of Chirayata.

Aims and Objectives

- To observe and compare the agnideepan activity of Kshar of *Swertia chirayata* roxb. Ex Flem. And *Swertia angustifolia* buch-ham. ExD. Don processed in mahishmootra.
- To evaluate the phytochemical and pharmacognostical properties of *Swertia chirayata* roxb. Ex Flem. and *Swertia angustifolia* buch-ham. ExD. Don.
- To evaluate the phytochemical properties of Kshar of *Swertia chirayata* roxb. Ex Flem. and *Swertia angustifolia* buch-ham. ExD. Don processed in mahishmootra.

MATERIAL AND METHODS

It was single centered, randomized, open label, interventional type, double Arm clinical trial. The study was explained clearly to the subjects and their signed, written informed consent was taken before starting the trial. Total 40 subjects completed the trial out of 49 subjects registered for the trial. Subjects were randomly assigned in two groups 20 in each group. Trial was conducted after approval of IEC of National Institute of Ayurveda

with approval no. No. IEC/ACA/2017/12. The trial was also registered in CTRI with registration no. CTRI/2019/01/017047. The trial drugs kshar of *Swertia chirayata* and kshar of *Swertia*

angustifolia were used individually in two groups which were processed in Mahishmootra.

Grouping, Dose, Duration of Treatment

Table 1: Distribution of Patients with dose, duration and Bhaishjaya Kaal

Group	No of Patients	Dose	Anupan	Duration of Therapy	Bhaishjaya Kaal
A. Kshar of <i>Swertiachirayata</i>	20	250 mg BD	Lukewarm ghee	21 days	Just before Principle Meal
B. Kshar of <i>Swertia angustifolia</i>	20	250 mg BD	Lukewarm ghee	21 days	Just before Principle Meal

Follow-up of patient was done on 10th and after 21st days of treatment. Improvement in the symptoms if any and other effects were noted down.

Inclusion criteria

- Patients having the classical signs and symptoms of jatharagnimandhya were selected
- Patients of either sex with the age group between 16- 70 years were selected.

Exclusion criteria

- Patients with chronic disease like severe Hypertension, IHD, COPD, DM, Cancer, hepatic and renal insufficiency, psychotic disorder like depression, schizophrenia.
- Any acute illness/ serious illness.
- Pregnant women and lactating mothers

Withdrawal criteria

- Patients developing any adverse drug reaction to the trial drug.
- Noncompliance of the patients.
- Any Serious Inter Current Illness.

Pretreatment Evaluation

After preliminary registration, all the patients were subjected to record their detail case history and physical examination as per following schedule.

Subjective parameters

A. Abhyavaharan Shakti

Table 2: Scales of measurement of parameter “Matra”

S. No.	Subjective parameter	Scores	Before treatment	After treatment
1.	Matravat Ahara, feels comfortable, proper digestion	0		
2.	Matravat Ahara, discomfort, proper digestion	1		
3.	Less than matravatahara, more discomfort	2		
4.	Not able to digest even little food feels more discomfort	3		

Table 3: Scales of measurement of parameter “Avriti”

S. No.	Subjective parameter	Scores	Before treatment	After treatment
1.	Intake of diet after 3½ to 4 hours of meal.	0		
2.	Intake of diet after 4-6 hours of meal.	1		
3.	Intake of diet after 6-8 hours of meal	2		
4.	Intake of diet after 8 hours of meal.	3		

B. Jaraṇa Shakti

Scoring according to Jeerna Aaharalakshana present after 4-6 hrs after taking food; they are Laghuta, Klamaparigamana, Kṣudha, Udgara Suddhi and Vegotsarga.

- Chief Complaints with Duration
- History of present illness
- History of past illness
- Family history of relevant disease
- Menstrual history (in case of females)
- Physical examination

In general examination, general condition, sensorium, gait, pulse rate, blood pressure, respiration rate, height, weight, body temperature, pallor, cyanosis, icterus, oedema, clubbing, thyroid enlargement, lymph nodes etc. were examined.

Systemic examination was conducted for detailed checkup of respiratory, cardiovascular, central nervous system, gastro-intestinal, musculo-skeletal and genitor-urinary system.

Biochemical Investigations

Stool R/E and LFT was done BT and AT to access the effect of test drug.

Parameters of assessment

Assessment was done under the headings of Subjective and Objective parameters.

Assessment of Subjective parameters were done based on WHO criteria for assessment of Agni.⁸

Table 4: Scales of measurement of Jarana shakti

S. No.	Subjective parameter	Scores	Before treatment	After treatment
1.	Presence of five symptoms	0		
2.	Presence of four symptoms.	1		
3.	Presence of three symptoms.	2		
4.	Presence of two symptoms	3		
5.	Presence of one symptom	4		
6.	Absence of all the symptoms	5		

Objective parameters

Table 5: Measurement of objective parameters

S. No.	Name of the test	B.T. (Day 0)	A.T. (Day 21)
1.	Stool R/E		
2.	LFT		

Statistical Analysis

For analysis of objective parameters the Paired t-test was done to compare the study subjects before and after the treatment in same group. Unpaired t-test (aka Student’s test) was done to compare in between the groups. The paired t-test reduces intersubject variability (because it makes comparisons between the same subject), and thus is theoretically more powerful than the unpaired t-test.

For analysis of subjective parameters the Wilcoxon signed-rank test was done, as it does not assume normality in the data, it can be used when this assumption has been violated and the use of the dependent t-test is inappropriate.

For comparison of subjective parameters in between the groups the Mann-Whitney U test was done, as this is the non-parametric alternative test to the independent sample t-test. It is a non-parametric test that is used to compare two sample means that come from the same population, and used to test whether two sample means are equal or not.

RESULT

Tables showing intra group comparison of effect of therapy in subjective parameters (Wilcoxon matched paired single ranked test)

Table 6: Effect of therapy on subjective parameters in both groups

Variable	Group	Mean		Mean Diff.	% Relief	SD ±	SE ±	P	S
		BT	AT						
Matra	A	1.55	0.30	1.25	80.64%	0.786	0.175	< 0.0001	ES
	B	1.40	0.35	1.05	75%	0.604	0.135	< 0.0001	ES
Aavruti	A	1.60	1.3	0.30	18.75%	0.47	0.105	< 0.05	S
	B	1.20	0.60	0.85	70.83%	0.68	0.15	< 0.001	VS
Jarana Shakti	A	1.85	1.55	0.30	16.21%	0.47	0.105	< 0.05	S
	B	1.35	1.05	0.30	22.22%	0.47	0.105	< 0.05	S

Table 7: Intergroup comparison of Group A and Group B for subjective parameters: (Mann-Whitney Test)

Variable	Groups	Mean diff.	SD ±	SE ±	P	S
Matra	A	1.25	0.78	0.17	> 0.05	NS
	B	1.000	0.56	0.12		
Aavruti	A	0.30	0.47	0.105	< 0.001	VS
	B	0.80	0.69	0.155		
Jaran Shakti	A	0.30	0.47	0.105	> 0.05	NS
	B	0.30	0.47	0.105		

Table 8: Effect of therapy on Objective Parameters (Paired 't' Test)

Parameters	Group	Mean		Diff	% Relief	SD ±	SE ±	T	P	S
		BT	AT							
Total Bilirubin	A	0.79	0.76	0.03	3.79%	0.086	0.019	1.55	> 0.05	NS
	B	0.86	0.83	0.03	3.48%	0.141	0.031	0.946	> 0.05	NS
Direct Bilirubin	A	0.22	0.19	0.035	15.9%	0.087	0.019	1.789	< 0.05	S
	B	0.23	0.20	0.035	15.21%	0.745	0.016	2.101	< 0.05	S
Indirect bilirubin	A	0.57	0.55	0.02	3.5%	0.069	0.015	1.285	> 0.05	NS
	B	0.56	0.52	0.04	7.14%	0.109	0.024	1.633	> 0.05	NS
Total protein	A	7.57	7.47	0.100	1.32%	0.786	0.175	0.568	> 0.05	NS
	B	7.48	7.15	0.33	4.41%	0.78	0.17	1.881	< 0.05	S
Albumin serum	A	4.32	4.14	0.18	4.16%	0.53	0.120	1.492	> 0.05	NS
	B	4.21	4.15	0.06	1.42%	0.57	0.129	0.464	> 0.05	NS
Serum globulin	A	2.79	2.68	0.11	3.94%	0.43	0.096	1.137	< 0.05	NS
	B	2.80	2.53	0.27	9.64%	0.69	0.15	1.77	> 0.05	S
A/G	A	1.35	1.28	0.065	4.81%	0.41	0.091	0.707	> 0.05	NS
	B	1.35	1.30	0.05	3.7%	0.40	0.091	0.547	> 0.05	NS
SGPT/ALT	A	51.02	47.26	3.76	7.36%	5.18	1.16	3.24	< 0.001	VS
	B	51.42	48.67	2.75	5.34%	5.15	1.15	2.38	< 0.05	S
SGOT/AST	A	49.87	48.23	1.63	3.26%	3.79	0.84	1.929	< 0.05	S
	B	50.80	48.69	2.10	4.13%	3.83	0.85	2.455	< 0.05	S
SGOT/SGPT	A	0.99	1.033	-0.038	3.83%	0.168	0.037	1.02	> 0.05	NS
	B	1.072	0.912	0.16	14.92%	0.204	0.045	3.504	< 0.001	VS
Alkaline phosphatase	A	322.95	306.87	16.073	4.97%	28.32	6.33	2.53	< 0.05	S
	B	322.35	293.10	29.24	9.07%	55.98	12.51	2.336	< 0.05	S

Table 9: Intergroup comparison of Group A and Group B on Objective Parameters (Unpaired t Test)

Variable	Groups	Mean	SD ±	SE ±	t value	P	S
Total bilirubin	A	0.03	0.086	0.019	1.123	> 0.05	NS
	B	0.03	0.141	0.031			
Direct bilirubin	A	0.035	0.087	0.019	1.318	> 0.05	NS
	B	0.035	0.074	0.016			
Indirect bilirubin	A	0.030	0.065	0.014	0.983	> 0.05	NS
	B	0.085	0.241	0.053			
Total protein	A	0.20	0.765	0.171	0.42	> 0.05	NS
	B	0.30	0.739	0.165			
Serum albumin	A	0.18	0.539	0.120	0.678	> 0.05	NS
	B	0.06	0.578	0.129			
Serum globulin	A	0.11	0.432	0.096	0.904	> 0.05	NS
	B	0.275	0.691	0.154			
A/G ratio	A	0.065	0.410	0.091	0.115	> 0.05	NS
	B	0.050	0.408	0.091			
SGPT/AST	A	1.639	3.79	0.849	0.427	> 0.05	NS
	B	2.155	3.84	0.858			
SGPT/ALT	A	3.625	5.13	1.149	0.574	> 0.05	NS
	B	2.69	5.15	1.152			
SGOT/SGPT	A	-0.088	0.279	0.061	3.492	< 0.0001	ES
	B	0.178	0.201	0.045			
Alkaline phosphatase	A	16.052	28.34	6.33	1.071	> 0.05	NS
	B	31.496	57.94	12.95			

Table 10: The % relief in both the groups in subjective parameters

Subjective parameters	% Relief in Group A	% Relief in Group B
Ahar Matra	80.64%	75%
Avriti	18.75%	70.83%
Jaran Shakti	16.21%	22.22%

Table 11: The % relief in both the groups in Objective parameters

Objective parameters	% Relief in Group A	% Relief in Group B
Total bilirubin	3.79%	3.48%
Direct bilirubin	15.9%	15.21%
Indirect bilirubin	3.5%	7.14%
Total protein	1.32%	4.41%
Serum albumin	4.16%	1.42 %
Serum globulin	3.94 %	9.64%
A/G ratio	4.81 %	3.7 %
SGOT/AST	3.26%	4.13%
SGPT/ALT	7.36%	5.34%
SGOT/SGPT	3.83%	14.92%
Alkaline phosphatase	4.97%	9.07%

After dealing with clinical study, observations in the patients about their data and disease presentation were done in detail. Out of 40 patients of Agnimandhya studied in this work, 57.5 % patients belonged to the age group of 26 to 35 years, 60% were females, 92.5 % were Hindus, 57.5 % were married, 42.5% patients were graduate, 47.5% patients were job holders, 67.5% were having middle socio-economic status, 77.50% were from urban area and 42.5% patients had the Kapha Vata Prakriti, and most all patients were of Madhyama Sara, Samhanana, Satva and Pramana etc. The maximum no of patients had Aruchi (92.5%) followed by Mukhadaurgandhya (80%), udaragaurav 77.5%, Atopa and daurvalya 55%, sakastajarana: 52.5%, adhmaan 50%, Hridayaavarodha 45%, Vidbheda and Kuksaparpidana 37.5%, Antrakunjana 32.5%, Kaarsya and Vidaha in 30% patients, Angamard in 27.5%, vatavarchaapravartan in 22.5% and Praseka in 20% of the patients.

Effects of therapy on Group A

Statistically extremely significant results ($p < 0.0001$) were found in Aharamatra 80.64%. Statistically very significant results ($p < 0.001$) were found in SGPT/ALT (7.36%). Statistically significant result ($p < 0.05$) were found in Aavriti (18.75%), Jaran Shakti (16.21%), Direct bilirubin (15.9%), SGOT/AST (3.26%) and alkaline phosphatase (4.97%). Statistically insignificant result ($p > 0.05$) was found in all of the remaining objective parameters.

Effects of therapy on Group B

Statistically extremely significant results ($p < 0.0001$) were found in found in Aharamatra (75%). Statistically very significant result ($p < 0.001$) were found in aavriti (70.83%) SGOT/SGPT (14.92%); Statistically significant results ($p < 0.05$) were found in Jaranshakti (22.22%), Direct bilirubin (15.21%), Total protein (4.41%), serum globulin (9.64%), SGOT/AST (4.13%), SGPT/ALT (5.34%), alkaline phosphatase (9.07%). Statistically insignificant result ($p > 0.05$) was found in all rest of the objective parameters.

DISCUSSION

Relief in overall signs and symptoms were observed slight better in Group B as compare to Group A. Here only slight difference in both groups was observed. In my point of view, the result obtained was more based on properties of kshar and mahishmootra than that of individual plant. As Acharya Charak states "sanskarohegunaantaraadhaan" which is best suited here. As we can see that properties of plants before processing and after preparation of kshar altered for example pH of plant was 5.4 whereas after preparation of kshar from these plants' pH changed into 9.9 which are alkaline by nature. This also showed that the formulations prepared exhibited more characteristics and

properties as of kshar. So, there was no much difference in effect of both drugs A and B. *Swertia chirayita* has been accepted as saastrotakiratiktika and its efficacy should have been better than *Swertia angustifolia*. But, after processing with maahishmootra and preparation of kshar, properties of kshar was more exhibited masking the properties of individual plant due to which result was affected accordingly.

Mode of action of Drug

Agnimandhya is caused by all three doshas but common cause of Agnimandhya is Kaphadosha. Kiratatiktika possess Tikta rasa, laghu, rukshya and saraguna, Sita virya, katuvipaka and ruchikaarak in karma. Mahishmootra possess is ushna, tikshna, rukshya, katu with lavan rasa and is kshariya in guna. It is used in udararoga, arsha, gulma, kustha, kilaasa and pandu. It also possesses dipan, anulomana, vishaghna, krimighna and kaphavatashamak property. Kshar possesses Ushna, tikshna, laghu, rukshya, dipan by nature. It is used in Gulma, udarroga, ajirna, aanaha, arochak, arsha, agnisang, vidradhi, krimi and visha. Tikta rasa is aamapachak in action, laghu and saraguna is kaphashaamak, aamapachak shrotoshodhak in action. In turn, aamapaachan results in agnivaradhan. Kaphashaman also is responsible in agnivaradhan. Here; rukshyaguna is possessed by all drugs. Rukshyaguna possesses soshan property. In pittajagnimandhya where dravatra of pitta is increased soshan property of rukshyaguna helps to balance pitta resulting in balanced agni. Ushna, Tikshnaguna of mahishmootra and kshar pacify kapha. Ushnavirya causes vatashaman. Prepared drug also possesses dipan, anuloman, ruchikaarakarma which directly cause agnideepan action. In one of the researches done gastro protective action of *Swertia chirayita* has been proved.⁹

CONCLUSION

From the present clinical trial which was conducted on 40 patients of Agnimandhya; based on the conceptual study, clinical observations and discussion the conclusion that could be drawn was that comparing the subjective parameters in two groups mild improvement was observed in both of them but overall percentage relief was more in Group B (kshar of *Swertia angustifolia*) than Group A (kshar of *Swertia chirayita*). Hence, agnideepan activity of kshar of *Swertia angustifolia* was observed to be more than that of kshar of *Swertia chirayita*.

REFERENCES

1. Kaviraj Ambikaduut Shastri, Sushruta Samhita with Ayurveda deepika commentary, Chowkhamba Sanskrit Sansthan, Varanasi. Sushrut Sutrashtan 48/15; 2006.
2. Yadavji Trikamji Acharya, Agnivesha Caraka Samhita with Ayurveda Dipika commentary of Cakrapanidatta,

- Caukhambha Sanskrit Samsthana, Varanasi, Reprint, Charaka Samhita Chikitsasthan 15/4; 2014.
3. Yadavji Trikamji Acharya, Caraka Samhita with Ayurveda Dipika commentary of Cakrapanidatta, Caukhambha Sanskrit Samsthana, Varanasi, Reprint, Charaka Vimanasthan 6/12; 2014.
 4. Kaviraja Gupta A, Hindi Commentary on Ashtanga Sangraha, Vol 1. Varanasi, Chaukhamba Krishanadas Academy, Ashtanga Sangraha Sutrasthana 12/1; 2005.
 5. Yadavji Trikamji Acharya, Agnivesha, Caraka Samhita with Ayurveda Dipika commentary of Cakrapanidatta, Caukhambha Sanskrit Samsthana, Varanasi, Reprint, Charaka Samhita Vimanasthan 8/143; 2014.
 6. Kaviraj Ambikaduat Shastri, Sushruta Samhita with Ayurveda deepika commentary, Chowkhamba Sanskrit Sansthan, Varanasi. Sushrut Samhita Sutrasthan 38/6; 2006.
 7. Yadavji Trikamji Acharya, Agnivesha, Caraka Samhita with Ayurveda Dipika commentary of Cakrapanidatta, Caukhambha Sanskrit Samsthana, Varanasi, Reprint, Charaka Samhita Chikitsasthan 15/181-182; 2014.
 8. Baghel MS, S Rajagopala, Developing guidelines for clinical research methodology in Ayurveda, Institute for Postgraduate teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar; 2011. p. 96.
 9. Selvamathy, SMKN, Geetha A and Saranya P. Gastro protective effect of *Swertia chirayita* - A study with ulcer induced rats. Pharmacology online 2010; 1: 332-355.

How to cite this article:

Sabita Sapkota and Mohan Lal. Comparative clinical study on Kshar of *Swertia chirayata* Roxb. Ex Flem. Buch and *Swertia angustifolia* Buch-ham. Ex D.Don, processed in Mahishmootra with special reference to Agnideepan activity. J Pharm Sci Innov. 2019;8(6):232-237.
<http://dx.doi.org/10.7897/2277-4572.086159>

Source of support: Nil, Conflict of interest: None Declared

Disclaimer: JPSI is solely owned by Moksha Publishing House - A non-profit publishing house, dedicated to publish quality research, while every effort has been taken to verify the accuracy of the content published in our Journal. JPSI cannot accept any responsibility or liability for the site content and articles published. The views expressed in articles by our contributing authors are not necessarily those of JPSI editor or editorial board members.