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Research Article

A COMPARATIVE CLINICAL STUDY TO ASSESS THE EFFICACY OF *TRINPANCHMOOLA KASHAYA* AND *PUNARNAVA KASHAYA* IN THE MANAGEMENT OF *MUTRADOSHVIKARA* W.S.R. TO CHRONIC KIDNEY DISEASE

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ABSTRACT

Chronic kidney disease (CKD) encompasses a spectrum of pathophysiologic processes associated with abnormal kidney function, often with a progressive decline in glomerular filtration rate. In Ayurveda, CKD is addressed under the concept of *Mutravah Srotas Vikar*, and also *Mutrakshaya* will be seen. The originators of Ayurveda, *Charaka, Sushruta*, and *Vagbhatta*, were aware about common illnesses. This illness affects all three *Doshas* and all *Dushyas.* Microangiopathy is caused by microvessel blockage, which is the responsibility of *Kapha* and the kidney's structural deterioration is caused by *Vata.* It is often left unnoticed at the early stages and generally diagnosed at later stages as the patient remains asymptomatic for long time. The purpose of this study was to find out an effective and well accepted drug with minimal or no complications for this illness. 30 patients who were diagnosed with *Mutradoshvikara* w.s.r. to Chronic Kidney Disease were allocated randomly into two groups. The trial drug i.e., *Trinpanchmoola Kashaya* 50ml twice a day was given to 15 patients of Group I and trial drug i.e., *Punarnava Kashaya* 50ml twice a day was given to 15 patients of Group II for the duration of 3 months. Subjective and objective parameters were assessed before and after the completion of trial. Data obtained during the trial was tabulated and statistically analysed.

INTRODUCTION

Chronic Kidney Disease is characterized with the presence of markers of kidney damage for more than 3 months, as defined by structural or functional abnormalities of the kidney with or without decreased glomerular filtration rate (GFR), manifest by either pathological abnormalities or other markers of kidney damage, including abnormalities in the composition of blood, urine or abnormalities in imaging tests or the presence of GFR less than 60ml/min/1.73m^2 for more than 3 months with or without other signs of kidney damage[1]. As renal failure arises when the kidney's ability to contribute to the body's metabolism is hampered. Even with advancements in research and development over the years, treating end-stage renal illness is still a challenging task in the medical field. In India, the Indian Society of Nephrology (ISN) has developed a CKD registry wherein epidemiological data of CKD patients is collected and analyzed. A recent report of this registry shows that patients first presented to a nephrologist at stage 5 in 47.5%, stage 4 in 25.5%, stage 3 in 19.6%, stage 2 in 4.9%, and stage 1 in 2.5%. It is very unfortunate that almost 50% of patients present for the first time to a nephrologist in CKD stage 5, when they cannot be offered anything more than dialysis or transplantation.[2] *Mutradosh vikara* is very well described under the disorders of *Mutravaha Srotas*. The pioneers of Ayurveda Charaka, Sushruta and Vagbhatta versed with common ailments. Eight varieties of *Mutrakrichhra*, thirteen types of *Mutraghatas*, four types of *Ashmaris*, and twenty types of *Prameha* are explained in Ayurveda.[3-5] *Mutrala* medication, also known as *Trinpanchmoola gana*, which contains the herbs *Kusha, Kasha, Nala, Darbha*, and *Ikshu* along with *Panchanga* of *Punarnava* is used

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to treat *Mutradosha Vikara.* These medications are important in treating both chronic renal disease and the signs and symptoms of *Mutradoshvika* [6]. These medications are known for their nephroprotective and diuretic properties. These herbal formulations are believed to exert beneficial effects on kidney function. The holistic Ayurvedic approach aimed to alleviate symptoms, slow down CKD progression, and potentially circumvent the need for hemodialysis.

AIMS AND OBJECTIVES

Primary Objective

To compare the efficacy of *Trinpanchmoola Kashaya* and *Punarnava Kashaya* in the management of *Mutradoshvikara* w.s.r. to chronic kidney disease.

Secondary Objective

To assess the clinical safety of *Trinpanchmoola Kashaya* and *Punarnava Kashaya* in the management of *Mutradoshvikara* w.s.r. to chronic kidney disease.

MATERIAL AND METHODS

Selection of the Patient

- The patients were selected from the O.P.D. and I.P.D. of Kayachikitsa of R.G.G.P.G. Ayurvedic College and Hospital Paprola, Dist. Kangra (H.P.) 176115.
- Total 30 patients were selected for the present study irrespective of the gender, caste and religion etc.

Study design

Study type - Randomized Clinical trial

Masking- Single blind

Timing- Prospective

Study Subjects- 30

No. of group- 2

Duration of trial- 12 weeks

Follow up visit- After every 12 weeks till the completion of trial

Diagnostic Criteria

Subjective criteria

The patients were diagnosed on the basis of clinical signs and symptoms of *Mutradoshvikara* as described in classical texts-

- *Gatravsada* (fatigue)
- *Aruchi* (anorexia)
- *Utklesh* (nausea)
- *Krichushvasta* (dyspnoea)
- *Shavthu* (oedema)

Objective Criteria

- Blood Urea - 50-100 mg /dl
- Serum Creatinine- 1.3 -4.0mg/dl
- GFR - 45-90ml/min/1.73m^2

Inclusion Criteria

- Patients willing to participate in the trial.
- Patient of either gender in the age group between 30 – 70 years.
- History of reduction of kidney function must be present over 3 months.
- Patients who had blood urea level above 50mg/dl and below 100mg/dl with or without any associated features of *Mutardoshvikara*.
- Patients who had serum creatinine level above 1.3mg/dl and below 4.0mg/dl with or without any associated features of *Mutardoshvikara*.

Exclusion Criteria

- Patients not willing for the trial.
- Patients below age of 30 years and above 70 years of age.
- Patients in advanced renal failure, with blood urea > 100mg/dl and serum creatinine > 4.0 mg/dl.
- Patients suffering from other major illness like Carcinoma or P.T.B. or any other condition considered to be unfit for enrolment in the trial.
- Patients with obstructed uropathy.
- Patients who had completed participation in any other clinical trial during the past 3 months.

Withdrawal Criteria

- If any concomitant serious illness develops that requires urgent treatment.
- Patient himself wants to withdraw from the trial.
- Non-compliance to treatment regimen.

Assessment Criteria

a. Objective criteria

Investigations

- Haematological
  CBC, ESR
- Biochemical investigations
  Blood urea, serum creatinine, FBS, SGOT, SGPT, serum uric acid, serum electrolyte (sodium, potassium, chloride)
- Routine and microscopic urine examination.

b. Subjective criteria

Scoring/grading system was adopted for the assessment of subjective parameters.

Grouping

Eligible enrolled study subjects were randomly divided into following two groups

Group I: 15 study subjects were managed with *Trinpanchmoola Kashaya* 50ml twice a day.

Group II: 15 study subjects were managed with *Punarnava Kashaya* 50ml twice a day.

Trial drug

a. *Trinpanchmoola Kashaya*[7]

"कुशःकाशःनलदर्भकाण्डेक्षुका इति तृणसंज्ञकः ।
मूत्रदोषविकारंच रक्तपित्तं तथैव च" ।।[3] Reference - Sushruta/ Sutra Sthana (38/77)

Name	**Botanical name**	***Rasa***	***Guna***	***Virya***	***Vipaka***	**Used parts**	***Doshkarma***
Kusha	*Desmostachya bipinnata* (Stapf.)	*Madhura, Kashaya*	*Laghu, Snigdha*	*Sheeta*	*Madhura*	Root	*Tridoshshamak*
Kasha	*Saccharum spontaneum* (Linn.)	*Madhura, Kashaya*	*Laghu, Snigdha*	*Sheeta*	*Madhura*	Root	*Vata-pitta shamak*
Nala	*Arundo donax* (Linn.)	*Madhura, Tikta, Kashya*	*Laghu, Snigdha*	*Sheeta*	*Madhura*	Root	*Vata-pitta shamak*
Darbha	*Saccharum officinarum* (Linn.)	*Madhura, Kashaya*	*Laghu, Snigdha*	*Sheeta*	*Madhura*	Root	*Tridoshshamak*
Ikshu	*Imperata cylindrical* (Linn.)	*Madhura*	*Guru, Snigdha*	*Sheeta*	*Madhura*	Root	*Vata-pitta shamak*

b. *Punarnava Kashaya*[8]

Reference - Ayurvedic Pharmacopeia of India, (Part. I, Vol. I)

Name	**Botanical name**	***Rasa***	***Guna***	***Virya***	***Vipaka***	**Used part**	***Doshkarma***
Punarnava	*Boerhavia diffusa* (Linn.)	*Madhura, Tikta, Kashaya*	*Laghu, Ruksha*	*Ushna*	*Madhura*	*Panchang*	*Tridoshshamaka*

Grading of Signs and Symptoms

The grading of subjective parameters is as follows:

***Gatravsada* (Fatigue)**

***Gatravsada* (Fatigue)**	**Grade**
No Fatigue	00
Mild fatigue on exertion	01
Moderate fatigue on exertion	02
Severe fatigue on exertion as well as on rest	03

***Aruchi* (Anorexia)**

***Aruchi* (Anorexia)**	**Grade**
No anorexia	00
Mild anorexia	01
Moderate anorexia	02
Severe anorexia	03

***Utklesh* (Nausea)**

***Utklesh* (Nausea)**	**Grade**
No nausea	00
Present occasionally and to a slight degree	01
Present frequently and to a recognisable extent	02
Present quite frequently and to intolerable extent	03

***Krichushvasta* (Dyspnea)**

***Krichushvasta* (Dyspnea)**	**Grade**
No breathlessness at all	00
Patient breathless on unaccustomed work	01
Patient breathless on accustomed work	02
Patient breathless even at rest	03

***Shavthu* (Oedema)**

***Shavthu* (Oedema)**	**Grade**
No oedema at all	00
Pedal oedema and pretibial oedema	01
Oedema involving pedal, pretibial and sacral	02
Anasarca, oedema associated with ascites	03

Urine albumin

Urine albumin	**Grade**
Trace	00
+	01
++	02
+++	03

Statistical Analysis

- Data was collected and recorded in detailed in clinical proforma. The obtained data was analyzed statistically and expressed in the terms of mean score before treatment (BT), after treatment (AT), difference of mean (BT-AT), standard deviation (SD) and standard error (SE). Overall percentage improvement of each patient was calculated.
- Data was arranged in MS Excel. Student's unpaired 't' test was used to compare difference in mean values between the two groups. Paired 't'-test has been used for within group analysis. The results were considered significant or insignificant depending upon the value of p.
- Highly significant $p<0.001$
- Significant $p<0.05$
- Insignificant $p>0.05$

OBSERVATIONS AND RESULTS

53.33% patients were male and 46.66% patients were female. Maximum number of patients in the present study i.e., 17 patients (56.6%) were in the age group 61-70 years followed by 8 patients (26.6%) in the age group of 41-50 years. Considering the religion, 100% patients were Hindu. All patients were married. 73.3% of the patients belonged to rural area and 26.6% of the patients were from urban area. Among 30 registered patients, maximum patients i.e., 40% were matriculate, 20% were educated up to graduate, 13.3% were studied upto primary and post graduate were 10% while rest 16.6% were illiterate. Among the 30 registered study subjects, majority of the patients were from APL class i.e., 73.3 % and 26.6% belonged to BPL class. In this distribution, majority of patients were doing household work i.e., 40% followed by 33.3 % patients were doing deskwork, 16.6% patients were field workers and 6.6% were labourer. Majority of the patients i.e., 53.3% consumed mixed diet while rest i.e. 46.6% patients were consuming vegetarian type of diet. In this distribution, majority of patients i.e., 50% have sedentary life style, 26.6% of patients had active type of lifestyle and 23.3% of patients had average life style. Majority of the patients in both the groups i.e., 73.3% had sound and adequate sleep followed by 26.6% had disturbed sleep. Among 30 registered patients, maximum i.e., 60% had normal appetite and 40% had normal diet. Maximum number of patients i.e., 60% had regular bowel movements, followed by 23.3 % having constipation and 16.6% had irregular bowel movements. Maximum number of patients i.e., 63% had scanty micturition, followed by 20% had normal urinary habits whereas 13% had burning micturition and 3.3 % had polyuria. Data showed that the maximum patients had *Pittakaphaja Prakriti* i.e., 63.3% followed by *Kaphavataja Prakriti* were 20% and rest 16.6% were of *Vatapittaja Prakriti.*

Clinical features

Clinical criteria	No. of patients		Total	Percentage
	Group I	Group II		
Gatravsada (Fatigue)	11	11	22	73.3%
Aruchi (Anorexia)	9	12	21	70%
Utklesh (Nausea)	9	12	21	70%
Krichushvasta (Dyspnea)	7	7	14	46.6%
Shavthu (Oedema)	14	6	20	66.6%
Urine output decreased	10	12	22	73.3%

Effect of Therapy and Results

All the patients were registered from OPD/IPD of R.G.G.P.G. Ayurvedic College & Hospital, Paprola, 30 patients were given the trial drugs. The effect of *Trinpanchmoola kashaya* and *Punarnava Kashaya* in 30 patients on various assessment criteria was obtained after statistical analysis of the data and is presented in tabular form.

Effect of therapy on Subjective criteria

S.No.	Symptoms	Group	N	Mean			Change in %	SD±	SE±	't'	p value	Significance
				BT	AT	Diff.						
1.	*Gatravsada*	GP-I	15	0.800	0.200	0.600	75%	0.507	0.131	4.583	<0.001	HS
		GP-II	15	0.800	0.267	0.533	66.6%	0.561	0.145	4.000	0.001	S
2.	*Aruchi*	GP-I	15	0.867	0.267	0.600	69.20%	0.507	0.131	4.583	<0.001	HS
		GP-II	15	0.867	0.237	0.600	66.62%	0.516	0.133	4.583	<0.001	HS
3.	*Utklesh*	GP-I	15	0.667	0.200	0.467	70.01%	0.516	0.133	3.500	0.004	S
		GP-II	15	0.933	0.333	0.600	64.3%	0.594	0.153	4.583	0.001	S
4.	*Krichushvasta*	GP-I	15	0.600	0.200	0.400	66.6%	0.507	0.131	3.055	0.009	S
		GP-II	15	0.733	0.267	0.467	63.71%	0.704	0.182	3.500	0.004	S
5.	*Shavthu*	GP-I	15	0.600	0.133	0.467	77.8%	0.516	0.133	3.500	0.004	S
		GP-II	15	0.600	0.200	0.400	66.66%	0.632	0.163	3.055	0.009	S

HS- Highly Significant, S- Significant, IS- Insignificant.

Intergroup Comparison of Subjective Parameters

The intergroup testing among two groups was done using unpaired t- test. The results were as follows-

Gatravsada

Intergroup comparison of effect of therapy on *Gatravsada* (Fatigue)

Comparison	% relief		Diff. of % relief	S.D ±	S.E.±	t value	P value	Sig.
GP-I vs GP-II	GP-I	75%	8.4%	0.5358	0.2030	t = 0.000	1.000	IS
	GP-II	66.6%						

Aruchi

Intergroup comparison of effect of therapy on *Aruchi* (Anorexia)

Comparison	%age relief		Diff. % relief	S.D ±	S.E.±	t value	P value	Sig.
GP-I vs GP-II	GP-I	69.20%	2.58%	0.5310	0.2012	0.724	0.357	IS
	GP-II	66.62%						

Utklesh

Intergroup comparison of effect of therapy on *Utklesh* (Nausea):

Comparison	% relief		Diff. of % relief	S.D ±	S.E.±	t value	P value	Sig.
GP-I vs GP-II	GP-I	70.1%	5.8%	0.5310	0.2012	0.714	0.481	IS
	GP-II	64.3%						

Krichushvasta

Intergroup comparison of effect of therapy on *Krichushvasta* (Dyspnea)

Comparison	% relief		Diff of % relief	S.D ±	S.E.±	t value	P value	Sig.
GP-I vs GP-II	GP-I	66.6%	2.889%	0.5310	0.2013	0.357	0.724	IS
	GP-II	63.71%						

Shavthu

Intergroup comparison of effect of therapy on *Shavthu* (Oedema)

Comparison	% relief		Diff of % relief	S.D ±	S.E.±	t value	P value	Sig.
GP-I vs GP-II	GP-I	77.8%	11.14%	0.5319	0.2012	0.357	0.724	IS
	GP-II	66.66%						

Effect of Therapy on Biochemical and Haematological Parameters

Variable	Group	N	Mean				SD	SE	't'	P	Sig
			BT	AT	Diff.	Change in %					
Hb	**GP- I**	15	11.41	11.64	-0.227	1.9%	0.680	0.176	-1.291	0.217	IS
	GP -II	15	10.81	11.40	-0.587	5.4%	0.619	0.160	-3.673	0.003	S
TLC	**GP -I**	15	6.711	6.650	0.0607	0.908%	0.796	0.205	0.295	0.772	IS
	GP -II	15	6.680	6.800	-0.120	1.7%	0.489	0.126	-0.951	0.358	IS
ESR	**GP- I**	15	21.067	20.267	0.800	3.7%	2.908	0.751	1.065	0.305	IS
	GP- II	15	21.200	20.933	0.267	1.25%	2.374	0.613	0.435	0.670	IS
Neutrophils	**GP- I**	15	63.280	63.080	0.200	0.31%	1.703	0.440	t = 0.455	P = 0.656	IS
	GP- II	15	59.907	59.867	0.0400	0.16%	4.739	1.224	t = 0.0327	P = 0.974	IS
Lymphocytes	**GP- I**	15	29.867	29.453	0.413	1.3%	2.670	0.689	t = 0.600	P = 0.558	IS
	GP- II	**15**	32.600	32.513	0.0867	0.31%	4.899	1.265	t = 0.0685	P = 0.946	IS
Mixed cells	**GP- I**	**15**	7.767	7.447	0.320	4.1%	0.592	0.153	t = 0.218	P = 0.831	IS
	GP -II	**15**	8.567	8.273	0.293	3.3%	1.196	0.309	t = 0.950	P = 0.358	IS

Intergroup comparison of effect of therapy on Haematological profile

Category	Comparison	% Change		Diff. of % relief	S.D ±	S.E.±	t value	P value	Sig.
Haemoglobin	GP-I vs GP-II	GP-I	1.9%	3.5%	0.559	0.211	3.99	<0.001	S
		GP-II	5.4%						
TLC	GP-I vs GP-II	GP-I	0.908%	0.792	0.2596	0.749	0.460	0.6851	IS
		GP-II	1.7%						
ESR	GP-I vs GP-II	GP-I	3.7%	2.45	1.0439	0.550	0.587	2.7549	IS
		GP-II	1.25%						

Neutrophils	GP-I vs GP-II	GP-I	0.31%	0.15%	3.665	1.388	0.207	0.838	IS
		GP-II	0.16%						
Lymphocytes	GP-I vs GP-II	GP-I	1.3%	0.99%	2.195	0.831	1.866	0.072	IS
		GP-II	0.31%						
Mixed cells	GP-I vs GP-II	GP-I	4.1%	0.8%	0.981	0.371	0.057	0.954	IS
		GP-II	3.3%						

On comparing both groups, statistically significant improvement was found in Haemoglobin, however the difference between other haematological parameters were statistically insignificant. It was found that all the haematological parameters were within normal limits before and after the trial.

Effect of Therapy on Biochemical Parameters

Group I AND Group II												
S No.	Variable	Group	N	Mean				SD	SE	't'	P	Sig
				BT	AT	Diff.	Change in %					
1.	B. Urea	GP- I	15	64.600	55.600	9.000	13.9%	3.873	1.000	9.000	<0.001	HS
		GP-II	15	64.333	56.467	7.867	12.2%	9.256	2.390	8.190	<0.001	HS
2.	S. Creat	GP- I	15	1.867	1.600	0.267	14.3%	0.145	0.037	7.135	<0.001	S
		GP- II	15	2.460	2.173	0.287	11.6%	0.467	0.121	8.527	<0.001	HS
3.	eGFR	GP- I	15	48.05	54.52	-6.473	13.47%	1.42	0.36	-16.42	<0.001	HS
		GP- II	15	47.373	52.22	-4.853	10.24%	1.656	0.428	-10.466	<0.001	HS
4.	SGOT	GP- I	15	28.533	28.400	0.133	0.4%	2.588	0.668	0.200	0.845	IS
		GP- II	15	33.733	32.467	1.267	3.75%	2.520	0.651	1.946	0.072	IS
5.	SGPT	GP- I	15	29.000	28.600	0.400	1.37%	2.028	0.524	0.764	0.458	IS
		GP- II	15	33.733	33.33	0.400	1.18%	2.197	0.567	0.705	0.492	IS
6.	FBS	GP- I	15	91.867	91.533	0.333	0.36%	3.922	1.013	0.329	0.747	IS
		GP- II	15	85.200	84.200	1.000	1.17%	2.000	0.516	1.936	0.073	IS
7.	Na	GP- I	15	136.080	135.000	1.080	0.79%	4.941	1.276	1.784	0.096	IS
		GP- II	15	135.68	134.933	0.747	0.55%	4.538	1.172	1.169	0.262	IS
8.	k	GP- I	15	4.073	4.033	0.0400	0.98%	0.358	0.0923	0.878	0.395	IS
		GP- II	15	4.073	4.007	0.0667	1.63%	0.358	0.0923	1.323	0.207	IS
9.	Cl	GP- I	15	100.960	99.800	3.289	1.14%	0.849	0.849	7.043	0.235	IS
		GP-II	15	100.96	100.960	0.960	0.95%	3.289	0.849	4.623	0.150	IS
10.	Urine Albumin	GP- I	15	0.800	0.267	0.533	66.62%	0.516	0.133	4.000	<0.001	S
		GP- II	15	1.200	0.533	0.667	55.58%	0.676	0.175	5.292	<0.001	S

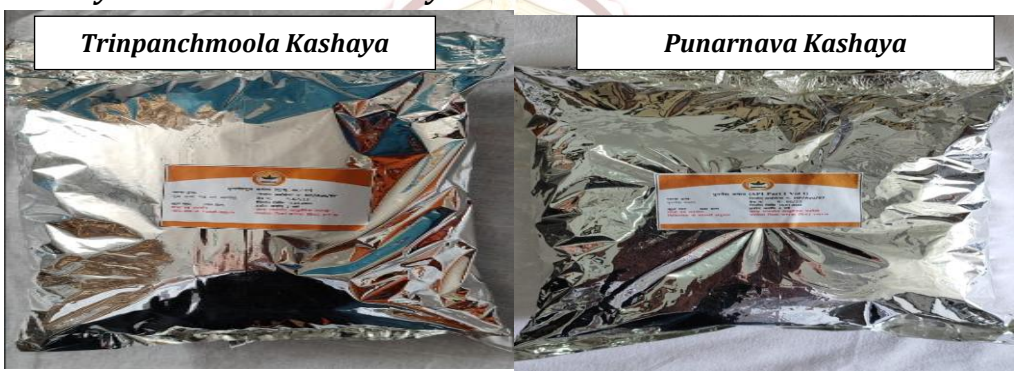
Intergroup comparison of Effect of therapy on Biochemical profile

Category	Comparison	% Change		Diff. of % relief	S.D ±	S.E.±	t value	P value	Sig.
B.Urea (mg/dl)	GP-I vs GP-II	GP-I	13.9%	1.7%	3.9405	1.4932	0.817	0.421	IS
		GP-II	12.2%						
S.Creatinine (mg/dl)	GP-I vs GP-II	GP-I	14.3%	2.7%	0.142	0.054	-0.564	0.582	IS
		GP-II	11.6%						
eGFR(Ml/min/	GP-I vs GP-II	GP-I	13.47%	3.23%	1.652	0.626	-3.070	0.005	S

1.73Mm2)		GP-II	10.24%						
SGOT (IU/L)	GP-I vs GP-II	GP-I	0.4%	3.35%	2.6505	1.004	-1.215	0.234	IS
		GP-II	3.75%						
SGPT (IU/L)	GP-I vs GP-II	GP-I	1.37%	0.19%	2.1944	0.8315	0.000	1.000	IS
		GP-II	1.18%						
FBS (mg/dl)	GP-I vs GP-II	GP-I	0.36%	-0.81%	3.2304	1.2241	-0.586	0.562	IS
		GP-II	1.17%						
Na (mEq/L)	GP-I vs GP-II	GP-I	0.79%	0.24%	2.5004	0.9475	0.379	0.708	IS
		GP-II	0.55%						
Cl (mEq/L)	GP-I vs GP-II	GP-I	1.14%	0.19%	0.7532	0.2854	0.755	0.457	IS
		GP-II	0.95%						
K (mEq/L)	GP-I vs GP-II	G-I	0.98%	-0.65	0.1931	0.0735	-0.393	0.698	IS
		G-II	1.63%						
Urine Albumin	GP-I vs GP-II	G-I	66.62%	11.04%	0.521	0.197	-0.727	0.473	IS
		G-II	55.58%						

On inter group comparison, statistically significant difference was found in eGFR however other biochemical parameters i.e. Fasting blood sugar, SGOT, SGPT, Blood urea, Serum creatinine, Serum Sodium, potassium, chloride and urine Albumin were statistically insignificant.

Trinpanchmoola Kashaya* and *Punarnava Kashaya



Effect of therapy on subjective criteria

- The frequency of various signs and symptoms observed in registered patients revealed that 73.3% patients were presents with *Gatravsada* (fatigue), 70% patients were presented with *Aruchi* (anorexia) & *Utklesh* (nausea), 46.6% patients were presented with *Krichushvasta* (dyspnea), 73.3% patients were presented with decreased urine output, 20% patients were presented with *Shavthu* (oedema).
- ***Gatravsada*** (Fatigue) **-** 75% relief in Group I and 66.6% relief in Group II was found after the therapy. The intergroup comparison showed equal results in Group I and Group II.
- ***Aruchi*** (Anorexia) **-** 69.2% relief in Group-I and 66.62% relief in Group-II was found after the therapy. The intergroup comparison showed equal results in Group I and Group II.
- ***Utklesh*** (Nausea) **-** 70% relief in Group I and 64.3% relief in Group II was found after the therapy. The intergroup comparison showed equal results in Group I and Group II.
- ***Krichushvasta*** (Dyspnea) **-** 66.6% relief in Group I and 63.7% relief in Group II was found after the therapy. The intergroup comparison showed equal results in Group I and Group II.
- ***Shavthu*** (Oedema) **-** 77.8% relief in Group I and 66.6% relief in Group II was found after the therapy. The intergroup comparison showed equal results in Group I and Group II.

Effect of therapy on objective criteria

- **Blood Urea-** After completion of treatment there was 13.9% and 12.2% reduction in Blood Urea level in Group I and Group II respectively. The intergroup comparison showed equal results in Group I and Group II.
- **Serum Creatinine-** After completion of treatment

there was 14.3% and 11.6% reduction in Serum Creatinine level in Group I and Group II respectively. The intergroup comparison showed equal results in Group I and Group II.

- **Estimated Glomerular filtration rate (eGFR) -** After completion of treatment there was 13.47% and 10.24% change in eGFR level in Group I and Group II respectively. The intergroup comparison showed that the effect of therapy on eGFR was better on the patients of Group I.
- **Urine Albumin:** After completion of treatment there was 13.47% and 10.24% reduction in Urine Albumin level in Group I and Group II respectively. The intergroup comparison showed equal results in Group I and Group II.
- **Haemoglobin:** After completion of treatment there was 5.4% rose in Haemoglobin in Group II which was statistically significant. On intergroup comparison, statistically significant result was found in Hb.

DISCUSSION

Probable Mode of Action of Drugs

- Ayurvedic classics have unique way to explain the mode of action of drugs. The action of every drug is determined by the dominant pharmacodynamic factors in that particular drug and that may be anyone out of *Rasa, Guna, Virya, Vipaka* and *Prabhava*, The main causative factor in *Mutradoshvikara* is vitiation of *Vata kapha pradhan tridosha*, which requires to be pacified. *Basti* is the seat of *Vata* and the act of micturition is under the control of *Apana Vayu*.
- In Ayurveda, this disease is considered as *Vatkaphaj Vikara* and other factors, which are involved in the pathogenesis, are *Apana Vayu, Mutra and Mutra Vaha Srotas*. Therefore, while selecting the drugs for present trial preference was given to the drugs having *Tridosha Shamaka* properties along with *Mutra Virechaniya* action.

***Trinpanchmoola Kwatha*:** The main reason to select this *Trinpanchmoola Kwatha* was that all the drugs *Kusha*, *Kasha*, *Nala, Darbha* and *Ikshu* have been said to have *Mutrakricchrahara* properties & *Pitta Vatahara* and *Basti shodhak*. Due to these activities the aggregate properties of *Trinpanchmoola Kwatha* are useful in *Samprapti Vighatana* of *Mutrakricchra*.

- All the drugs are having *Madhura* and *Kashaya rasa* except *Ikshu* which having only *Madhura rasa*, all are having *Sheeta Veerya*, *Madhur Vipaka*, *Laghu* and *Snigdha Guna* and all are having *Prabhav* i.e*., Mutrakricchrahara.* Considering above properties of all the drugs, *Trinpanchmoola Kwatha* gets absorbs easily and does *Pitta* and *Vata Shamana* and acts as *Mutral* or diuretic.
- *Trinpanchmoola Kwatha* also does *Mutravirechan* and *Bastishodhan* by their properties, so these preparations have shown effective result in patient of *Mutrakricchra* by breaking the pathogenesis of disease.
- Its main action is to inhibit re-absorption of sodium and water from the renal tubules leading to diuresis. In addition to this, it also possesses anti-inflammatory and antibacterial properties, which help in controlling both inflammation and infection[1].

Punarnava Kawatha

- The meaning of *Punarnava* is the rejuvenation or regeneration of the body's cells. *Punarnava* can rejuvenate dying cells and help to revive the dying organs of the body. *Punarnava* mentioned as *Vishghna dravya* [antitoxic drug] in *Shusrut Samhita kalpa sthana*. *Punarnava* used as *Ekala dravya* in the treatment of kidney disease on the basis of its antitoxic and rejuvenation properties. *Punarnava*, having diuretic properties (*Mutravirechan*), removes contaminants from the blood through the urine and acts as a *Vishghna dravya* (anti-toxic drug).
- The nephroprotective effect of *Punarnava* has been clearly demonstrated in vitro, in vivo and in many clinical studies. The most commonly employed extracts were aqueous, hydroalcoholic, ethanolic, and methanolic extracts. These extracts have antifibrotic property reducing the formation of extracellular collagen deposition in the renal tubules.

CONCLUSION

After the careful review of the results obtained from the study entitled "A comparative clinical study to assess the efficacy of *Trinpanchmoola Kashaya* and *Punarnava Kashaya* in the management of *Mutradoshvikara* w.s.r. to Chronic Kidney Disease", following conclusion can be drawn:

- Patients were treated with *Trinpanchmoola Kashaya*, showed statistically highly significant result on subjective parameters i.e., *Gatravsada and Aruchi* while statistically significant relief was found in *Utklesh*, *Krichushyasta and Shavthu*.
- Patients were treated with *Punarnava Kashaya* showed statistically highly significant result on all subjective parameters of *Mutradoshvikara* i.e., chronic kidney disease except for *Aruchi*, which showed statistically significant improvement.
- Statistically group I and group II showed similar

effects. But on the basis of improvement in symptoms, *Trinpanchmoola Kashaya* of group I yielded more result than that of group II.

- Blood urea and serum creatinine level were statistically significantly decreased in both groups but maximum decrease was found in Group I, wherein the patients were managed with *Trinpanchmoola Kashaya*.
- Estimated Glomerular filtration rate (eGFR) was statistically increased significantly in both groups but maximum increase was found in Group I, wherein the patients were managed with *Trinpanchmoola Kashaya*.
- Statistically significant reduction in Urine Albumin was observed after the therapy in both groups
- Statistically significant increase in Haemoglobin was observed after the therapy in group II wherein the patients were managed with *Punarnava Kashaya*. However other haematological and biochemical values i.e., TLC, DLC, FBS, ESR SGOT, SGPT and Serum Electrolytes (Sodium, Potassium and Chloride) remained within normal range in both groups during and after the completion of trial.
- No untoward effect of *Trinpanchmoola Kashaya* and *Punarnava Kashaya* was observed during the entire trial period after administration of drug.
- Thus on the basis of clinical study, it can be concluded that *Trinpanchmoola Kashaya* is more effective in the management of chronic kidney disease i.e., *Mutradoshvikara.*

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