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A Comparative Clinical Study to Evaluate the Effect of *Dhatrayadi Kwatha* and *Dhatrayadi Kwatha* with *Yavakshara* in the Management of *Mutrakrichhra* w.s.r. to Urinary Tract Infection

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ABSTRACT

Mutrakrichhra remains a common clinical health problem in the community despite the advances in the understanding of the causes and consequences of urinary tract infection. This comparative clinical study was conducted to evaluate the effect of *Dhatrayadi Kwatha* and *Yavakshara* in the management of *Mutrakrichhra* (Urinary Tract Infections). The study was conducted on thirty patients of *Mutrakrichhra*. Patients fulfilling the inclusion criteria were randomly selected for the trial and put into two groups, 15 patients in each group. Patients of group-I were treated with *Dhatrayadi Kwatha* while patients of group-II were treated with *Dhatrayadi Kwatha* and *Yavakshara*. Symptoms of *Mutrakrichhra* as *Sadaha*, *Saruja*, *Krichhra*, *Peeta* and *Muhur Muhur Mutrata* as well as haematological and urine assessment was done before and after treatment. Patients of obstructive uropathy, renal failure were excluded from the study. Assessment suggests improvement in symptoms of *Mutrakrichhra* after four weeks of treatment. The symptomatic improvement was observed with statistically significant results ($p > 0.001$). The research study showed that Group-II (*Dhatrayadi Kwatha* and *Yavakshara*) showed better result compared with Group-I (*Dhatrayadi Kwatha* only).

Key Words *Mutrakrichhra*, *Urinary Tract Infection*, *Dhatrayadi Kwatha*, *Yavakshara*

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INTRODUCTION

Mutrakrichhra is a disorder of *Mutravahasrotas*, which includes those forms of urinary disorders where *Mutrakrichhra*¹ (difficulty in micturition) is the cardinal feature. *Vitiated Pitta* and *Pratiloma Gati* of *Apana Vayu* are considered to be the two major factors for the pathogenesis of the disease “*Mutrakrichhra*” in classical Ayurvedic texts². While analysing the

symptomatology of *Mutrakrichhra*, it appears that various stages of acute and chronic urinary tract infections come under this heading. Urinary Tract Infection is a microbial infection that involves kidneys, ureter, bladder or urethra³. It encompasses both asymptomatic microbial colonization of the urine and symptomatic infection with microbial invasion and inflammation of urinary tract⁴. UTI is the most

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common bacterial infection encountered in general practice and accounts for 1-3% of consultations. Up to 50% of women have a UTI at some time in entire life⁵. Most commonly the causative organism is *Escherichia coli* which are observed in about 80% of patients suffering from urinary tract infection⁶. The prevalence of UTI in women is about 3% at the age of 20, increase by about 1% in each subsequent decade. UTI's are the leading cause of gram negative sepsis in hospitalized patients. With the introduction of antibiotics in modern medicine it has become easier to treat the urinary tract infections but still chances of reinfection and relapse are major problems. Simultaneously, the development of resistance is also a major issue⁷. Urinary tract infections also keep on increasing with repeated indiscriminate use of antibiotics. Urinary tract infections can be safely and effectively treated with herbal treatment with no side effects. The drugs having the properties of *Dosha Shamanam*, *Srotoshodhna*, *Mutra-virechniya*, *Mutra-Visodhaniya* are indicated in *Mutrakrichhra Roga*⁸. Hence *DhatrayadiKwatha*⁹ and *Yavakshara*¹⁰ drugs have been selected to evaluate their efficacy in *Mutrakrichhra*.

AIMS AND OBJECTIVES

To compare the efficacy of *Dhatrayadi Kwatha* with *Dhatrayadi Kwatha* along with *Yavakshara* in the management of *Mutrakrichhra* w.s.r. to Urinary Tract Infections.

MATERIALS AND METHODS

SOURCE OF DATA

Total 30 patients of *Mutrakrichhra* (Urinary Tract Infection) fulfilling the inclusion criteria were taken for the study irrespective of gender, caste & religion from the OPD/IPD of Rajiv Gandhi Government Post Graduate Ayurvedic Hospital Paprola (H.P.). They were randomly divided into two groups. Patients of Group-I were managed with *Dhatrayadi Kwatha* twice a day. Patients of Group-II were managed with, *Dhatrayadi Kwatha* along with *Yavakshara* twice a day. Intervention period was of four weeks. Clinical evaluation was done every seven days, while haematological and biochemical investigations were done before and after completion of therapy. Assessment of the therapy was done on the basis of subjective and objective parameters. It was a randomized controlled clinical study.

CRITERIA OF DIAGNOSIS

Inclusion Criteria: Following criteria were set to include the individuals for trial:

1. Patients of either gender aged between 20 - 70 yrs.
2. Patients who presented with signs and symptoms of *Mutrakrichhra* as mentioned in classical texts.
3. Patients who were willing and ready for the enrollment in the trial.

Exclusion Criteria: Following criteria was set to exclude the individuals for trial:

1. Patients below the age of 20yrs and above the age of 70yrs.
2. Patients not willing to undergo for trial.
3. Patients of associated obstructed uropathy.

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4. Patients suffering from metabolic chronic illness were excluded from the trial.

Diagnostic criteria

Subjective criteria

- *Sadaha Mutrata* (Burning micturition)
- *Peeta Mutrata* (Yellowish discoloration of urine)
- *Krichhra Mutrata* (Difficulty in micturition)
- *Saruja Mutrata* (Dysuria)
- *Muhur Muhur Mutrata* (Increased Frequency of micturition)
- *Sarakta Mutrata* (Haematuria)

Objective criteria

- Urine – Routine and Microscopy.
- TLC and ESR
- Urine culture

Laboratory Investigations:

A. Blood examination

- Routine Blood Examination - Hb%, TLC, DLC, ESR,
- Biochemistry Examinations - B.Urea, S.Creatinine, FBS, SGOT, SGPT

B. Urine Examination- Routine and Microscopic Urine culture

METHODS OF STUDY

Table 1 Pharmacological Characters of Ingredients of *Dhatrayadi Kwatha*

Sr. No.	Ingredient	Botanical Name	Rasa	Guna	Veerya	Vipaka	Dosha Karma
1.	<i>Amalaki</i>	<i>Embllica officinale</i> (Gaertn)	<i>Pancharasa</i> (Alavana-Amla <i>pradhana</i>)	<i>Laghu, Ruksha</i>	<i>Sheeta</i>	<i>Madhura</i>	<i>Tridosahar</i>
2.	<i>Draksha</i>	<i>Vitis vinifera</i> (Linn.)	<i>Madhura</i>	<i>Snigdha, Guru, Mridu</i>	<i>Sheeta</i>	<i>Madhura</i>	<i>Pitashamana</i>
3.	<i>Vidari</i>	<i>Pueraria tuberosa</i> (DC.)	<i>Madhura</i>	<i>Guru, Snigdha</i>	<i>Sheeta</i>	<i>Madhura</i>	<i>Vatapittashamana</i>

The clinical trial was started after the approval from Institutional Ethical Committee vide certificate No. Ayu/IEC/2018/1180. The study has also been registered in Clinical Trial Registry of India vide CTRI No. CTRI/2020/07/026386. An information sheet was given to the patients registered in the study giving all the details of the study protocols, benefits of the trial and any expected untoward effects. A detailed proforma incorporating demographic profile, detailed history followed by general physical, systemic examination, Subjective parameters and biochemical investigations was prepared to note down all the details of the patients.

GROUPING

Thirty patients fulfilling the inclusion criteria were randomly divided into two groups:

Group 1: In this group 15 patients of *Mutrakrichhra* were managed with *Dhatrayadi Kwatha*.

Group 2: In this group 15 patients of *Mutrakrichhra* were managed with *Dhatrayadi Kwatha* along with *Yavakshara*.

TRIAL DRUG

Dhatrayadi Kwatha and Yavakshara
(Table No.1 & 2)

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4.	<i>Madhuyasthi</i>	<i>Glycerrhiza glabra</i> (Linn.)	<i>Madhura</i>	<i>Guru Snigdha</i>	, <i>Sheeta</i>	<i>Madhura</i>	<i>Vatapittashamana</i>
5.	<i>Gokshura</i>	<i>Tribulus terresteris</i> (Linn.)	<i>Madhura</i>	<i>Guru Snigdha</i>	, <i>Sheeta</i>	<i>Madhura</i>	<i>Vatapittashamana</i>

Table 2 Pharmacological Characters of Ingredients of *Yavak* and *Madhu*

Sr. No.	Ingredient	Rasa	Guna	Veerya	Vipaka	Dosha Karma
1.	<i>Yavak</i>	<i>Madhura</i> , <i>Tikta</i> , <i>Kashaya</i>	<i>Laghu</i> , <i>Ruksha</i> , <i>Pichila</i> , <i>Mridu Sara</i>	<i>Sheeta</i>	<i>Katu</i>	<i>Kaphpittahara</i> , <i>Vatakara</i>
2.	<i>Madhu</i>	<i>Madhura</i> <i>Anurasa-Kashya</i>	<i>Ruksha</i> , <i>Sheeta</i>	<i>Ushna</i>	<i>Katu</i>	<i>Tridoshahara</i>

SELECTION AND PREPARATION OF DRUG

Dhatrayadi Kwatha and *Yavakshara* were described in *Bhaishajya Ratnavalifor* the management of *Mutrakrichhra*. The drug was prepared by Pharmacy experts of *Charaka Rajkiya Ayurveda Pharmacy*, Paprola, Dist. Kangra H.P. as per G.M.P. norms.

ADMINISTRATION AND DOSE OF DRUG

Dose: *DhatrayadiKwatha* 40 ml BD with water (40 gram raw drug is added to 640 ml of water and then it is boiled and reduced to 80 ml, then divided in two equal doses).

Dose: *Yavakshara* – 1 gm BD with honey.

❖ **Route of Administration** -Oral

❖ **Duration of Trial** – 4 weeks

CRITERIA OF ASSESSMENT

Clinical results were assessed based on subjective and objective parameters. To assess the various signs and symptoms, Scoring System was adopted.

1. Sadaha Mutrata (Burning micturition)

Grade-0 - No burning micturition

- Grade-1 -Mild burning micturition(Burning at the starting of micturition)
- Grade-2 -Moderate burning micturition(Burning at the starting and during micturition)
- Grade-3-Severe burning micturition(Burning which is not tolerable and prolonged for time)

2. Krichhra Mutrata(Difficulty in micturition)

- Grade-0 - No difficulty
- Grade-1 -Difficulty present at the beginning of the act
- Grade-2 - Difficulty present at the beginning and partially during the rest of the act.
- Grade-3 - Difficulty present throughout the act of micturition.

3. Saruja Mutrata (Dysuria)

- Grade-0 - No Pain
- Grade-1 - Mild pain (Patient not complaining of pain as a symptom but on interrogation patient complains of slight pain)
- Grade-2 - Moderate pain (Patient complains of pain)

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- Grade-3 - Severe pain (Patient complains of pain and ask for immediate intervention)

4. *Muhur Muhur Mutrata* (Increased frequency of micturition)

- Grade-0-Normal micturition (Patient passing urine 4-5 times a day)
- Grade-1- Frequent micturition but controllable (Patient passing urine 6-10 times a day)
- Grade-2- Frequent micturition but not able to control (Patient passing urine 11-20 times a day)
- Grade- 3- Frequent micturition (Patient passing urine >21 times a day)

5. *Peeta Mutrata* (Yellowish discolouration of urine)

- Grade-0 - Straw colour
- Grade-1 - Lemon yellow colour
- Grade-2- Dark yellow colour
- Grade-3 - Mustard yellow colour

6. *Sarakta Mutrata* (Haematuria)

- Grade-0- No hematuria
- Grade-1- Smoky urine
- Grade-2- Reddish urine
- Grade-3 - Frank hematuria

Objective criteria

1.Pus cells in urine

- Grade-0- 0-2/h.p.f
- Grade-1- 3-10/h.p.f
- Grade-2- 10-20/h.p.f
- Grade-3 - >20/h.p.f

2. Urine Culture

- Grade-0 –No Growth
- Grade-1 –Bacterial count up to 10^5
- Grade-2- Bacterial count up to 10^6 - 10^{10}
- Grade-3- Bacterial count $>10^{10}$

OBSERVATIONS AND RESULTS

“Paired t-test” was carried out for various objective parameters within the group and “Unpaired t-test” was carried out between the groups at $p>0.05$, $p<0.05$ and $p<0.001$. The results were categorized as significant or insignificant depending upon the p-value.

- ❖ Highly Significant - p value <0.001
- ❖ Significant - p value <0.05
- ❖ Insignificant- p value >0.05

Mutrakrichhra (Urinary tract infection) is a common condition affecting both gender and all age groups. Maximum numbers of patients i.e. eight patients (26.67%) were in the age group of 20-29 years and eight patients were in age group 50-59 years followed by five patients in 40-49 years age group i.e. 16.67%. Maximum numbers of subjects were female i.e. twenty three patients (76.67%) and seven (23.33%) patients were male. All registered patients were Hindu i.e. thirty (100%) and belonged to rural population i.e. sixteen patients (53.33%). Maximum patients enrolled in the study were married i.e. twenty three patients (77.67%). Most of the patients i.e. twenty seven (90%) with mixed dietary habits were recorded to be suffering from this disease. Most of the patients had moderate manual working life style. Twenty two patients (73.33%)

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had regular bowel habit while 26.67% patients had irregular bowel habits. Sleep pattern of 43.33% of patients was found disturbed due to increased frequency of micturition. Maximum number of patients i.e.36.67% had poor personal hygiene. 46.67% of the registered patients had *Vata-Pittaja Prakriti*. As per figure no.1. The results of the study are given in Table no. 3-7 and Figure no.2-5.

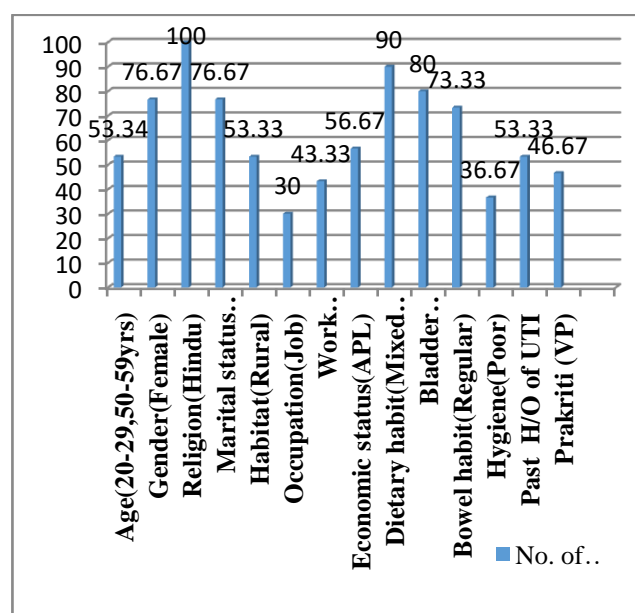


Figure 1

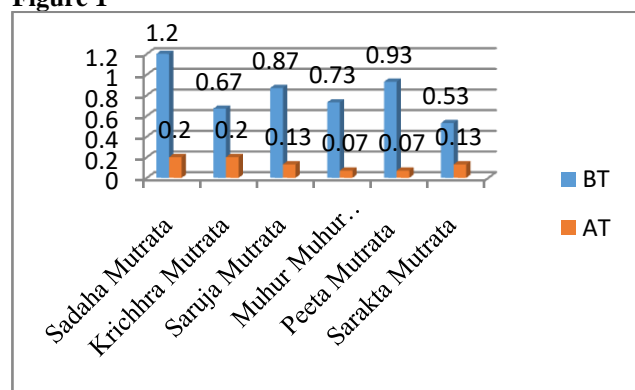


Figure 2 Effect of therapy on subjective criteria in Group-I

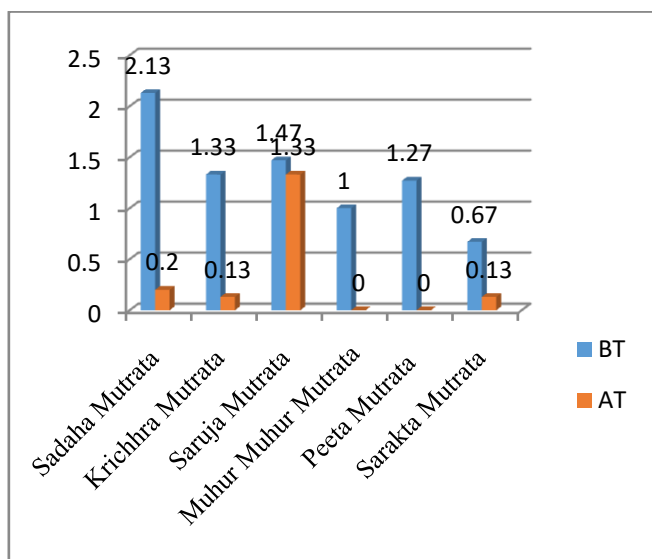


Figure 3 Effect of therapy on subjective criteria in Group-II

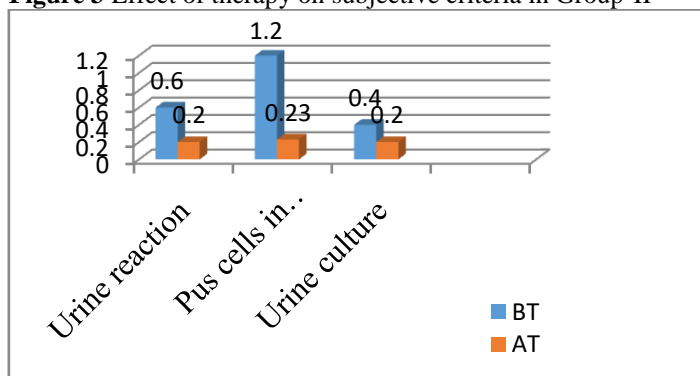


Figure 4 Effect of therapy on Objective parameters: Group-I

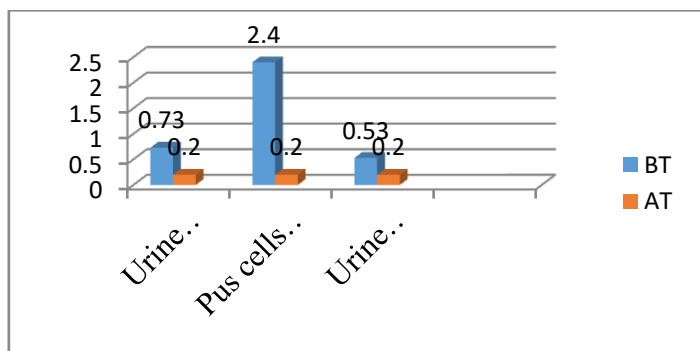


Figure 5 Effect of therapy on Objective parameters: Group-II

Table 3 Various symptoms of *Mutrakrichhra* observed in registered patients

Clinical features	Group I		Group II		Total	% age
	No. of pts.	% age	No. of pts.	%age		
<i>Sadaha Mutrata</i>	5	60%	14	93.33%	19	63.33%
<i>Peeta Mutrata</i>	13	86.67%	13	86.67%	26	86.67%
<i>Krichhra Mutrata</i>	5	33.33%	11	73.33%	16	53.33%
<i>Saruja Mutrata</i>	5	33.33%	8	53.33%	13	43.33%
<i>Muhur Muhur Mutrata</i>	13	86.67%	13	86.67%	26	86.67%
<i>Sarakta Mutrata</i>	3	20%	4	26.67%	7	23.33%



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Table 4 Comparison on effect of therapy on clinical features of *Mutrakrichhra* before and after therapy

Sr. No.	Symptoms	Group	Mean Score		% Change	SD±	SE±	't'	'p'	Inter-group Comparison
			BT	AT						
1	<i>Sadaha Mutrata</i>	Group-I	1.20	0.20	83.33%	0.378	0.097	10.25	<0.001	p=<0.001
		Group-II	2.13	0.20	90.75%	0.594	0.153	12.67	<0.001	
2	<i>Krichhra Mutrata</i>	Group-I	0.67	0.20	70.01%	0.516	0.133	3.500	0.004	p=<0.001
		Group-II	1.33	0.13	90.02%	0.561	0.145	8.290	<0.001	
3	<i>Saruja Mutrata</i>	Group-I	0.87	0.13	84.65%	0.458	0.118	6.205	<0.001	p=0.002
		Group-II	1.47	1.33	90%	0.488	0.126	10.58	<0.001	
4	<i>Muhur Mutrata</i>	Group-I	0.73	0.07	91.27%	0.478	0.126	5.292	<0.001	p=0.046
		Group-II	1.00	0.00	100%	0.378	0.097	10.25	<0.001	
5	<i>Peeta Mutrata</i>	Group I	0.93	0.07	92.85%	0.352	0.091	9.539	<0.001	p=0.012
		Group II	1.27	0.00	100%	0.458	0.118	10.72	<0.001	
6	<i>Sarakta Mutrata</i>	Group I	0.53	0.13	75.05%	0.507	0.131	3.055	0.009	p=0.533
		Group II	0.67	0.13	80.05%	0.642	0.165	3.228	0.006	

BT: Before treatment; AT: After treatment; S.D: Standard deviation; S.E: Standard error

Table 5 Effect of therapy on objective criteria

Sr. No.	Symptoms	Group	Mean Score		% Change	SD±	SE±	't'	'p'	Inter-group Comparison
			BT	AT						
1	Urine reaction	Group-I	0.60	0.20	66.67%	0.507	0.131	3.055	0.011	p=0.492
		Group-II	0.73	0.20	76.12%	0.516	0.133	4.000	0.02	
2	Pus cells in urine	Group-I	1.2	0.23	83.33%	0.378	0.097	10.27	<0.001	p=<0.001
		Group-II	2.4	0.20	91.67%	0.676	0.175	12.06	<0.001	
3	Urine culture	Group-I	0.40	0.20	50%	0.414	0.107	1.871	0.082	p=0.471
		Group-II	0.53	0.20	60.91%	0.488	0.126	0.646	0.021	

Table 6 Effect of therapy on Hematological and Biochemical Parameters

Category	Group	Mean score		% Change	Mean Diff.	SD±	SE±	t-value	p-value
		BT	AT						
Hb gm/dl	Group-I	11.71	12.20	4.18%	0.493	1.369	0.354	1.395	0.185
	Group-II	11.97	11.47	4.13%	0.493	1.574	0.406	1.214	0.245
TLC (cumm)	Group-I	9430	8240	12.62%	1190	1969.8	508.6	2.340	0.055
	Group-II	9529	8560	10.27%	969.3	2984.3	770.6	1.258	0.229
ESR (mm fall in first hour)	Group-I	23.92	20.91	15.31%	3.714	16.43	4.392	0.846	0.413
	Group-II	31.73	27.80	12.31%	3.933	12.65	3.267	1.204	0.249
B.UREA (mg/dl)	Group-I	25.80	22.60	12.42%	3.200	6.439	1.662	1.925	0.075
	Group-II	28.53	22.47	21.21%	6.067	4.978	1.285	4.720	0.05
S.CREAT (mg/dl)	Group-I	0.90	0.867	11.11%	0.033	0.150	0.038	0.863	0.403
	Group-II	0.90	0.873	11.12%	0.027	0.175	0.045	0.590	0.565
FBS (mg/dl)	Group-I	96.47	91.47	5.183%	5.000	13.74	3.548	1.409	0.181
	Group-II	95.87	94.80	1.11%	1.067	5.599	1.446	0.738	0.473

Table 7 Overall Effect of Therapy

Category of improvement	Group-I	Group-II	Total
Cured (100%)	2	3	5
Marked improvement (76-99%)	5	6	11
Moderate improvement (51-75%)	7	6	13
Mild improvement (26-50%)	1	0	1
No improvement (<25%)	0	0	0

DISCUSSION *Mutrakrichha* is most common complaint and recurring problem in daily clinical

practice .All the *Nidana* of *Mutrakrichha* ultimately results in the *Tridoshaprokopa* and



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Mandagni (Aam production) which along with *Kha- Vaigunya* initiate further pathogenesis. *Mutrakrichha* can be compared with urinary tract infections (UTIs) due to similarity in clinical appearance. Overall, *Peeta mutrata*, *Sarakta mutrata*, *Saruja mutrata*, *Sadaha mutrata*, *Muhur-muhurmutrata* and *Krichhra mutrata* were considerably reduced in almost all the patients under trial. The results showed that trial drugs provided statistically highly significant and moderately significant relief in clinical features. Overall effect of the therapy revealed that five patients were completely cured and eleven patients showed marked improvement, while thirteen patients showed moderate improvement; one patient showed mild improvement and none of patient remained unimproved. The action of every drug is determined by the dominant pharmacodynamic factor in that particular drug and that may be anyone out of *Rasa*, *Guna*, *Virya*, *Vipaka* and *Prabhava*¹¹. The fundamentals regarding treatment in *Ayurveda* are mainly based on the *Dosha Chikitsa*. In *Mutrakrichhra*, the main *Dosha* involved is *Pitta* which gets vitiated and needs to be pacified. Micturition is under the control of *ApanaVayu*. So, *Apana Vayu*, *Mutra* and *Mutravaha Srotas* are directly involved in the pathogenesis of *Mutrakrichhra*¹². Drugs having *Pitta Shamaka* and *Vata Shamaka* properties along with *Vedana Shamaka* and *Mutra-virechaniya* action are used for the treatment of *Mutrakrichchhra*. *Dhatrayadi Kwatha* possesses these properties; therefore, it is selected for this study. The formulation of

*Dhatryadi Kwatha*⁹ and *Yavakshara*¹⁰ has been described in detail in *Bhaishajya Ratnavali* in *Mutrakrichhra Chikitsa Prakarna*. This formulation consists of *Amalaki*, *Draksha*, *Vidari*, *Madhuyashthi* and *Gokshura*. All these ingredients were taken in equal parts. *Gokshura* has been described in *Mutra Virechaniya Gana*¹³. It possesses *Madhura Rasa*, *Guru-snigdha Guna*, *Sheeta Veerya* and *Madhura Vipaka* with *Vatapittashamaka*, *Ashmarihara* and *Basti Shodhana Karma*¹⁴. Due to its specific pharmacodynamics properties, it alleviates both vitiated *Pitta* and *VataDosha* which are primarily involved in the pathogenesis of *Mutrakrichhra*. Additionally, *Gokshura* has diuretic property due to presence of large quantities of nitrates and essential oil present in its fruits and seeds¹⁵. By virtue of its diuretic action¹⁶, it irrigates the bladder that results in removal of urinary pathogens. *Gokshura* also possesses the anti-inflammatory and anti-bacterial property¹⁷. It has strong anti-bacterial activity against the *Staphylococcus aureus* and *E. coli* pathogens which are commonly involved in urinary tract infection¹⁸. *Amalaki* has *Lavanarहित Pancharasa*; *Laghu*, *Ruksha guna*, *Sheeta veerya* and *Madhura Vipaka*¹⁹. Because of *Sheeta Veerya* and *Tridosahara* properties it helps to overcome the *Pittaja lakshana* which are seen in *Mutrakrichhra*. It is also used as anti-oxidant²⁰. *Draksha*, *Mulathi*, *Vidari* all these ingredients have *Sheeta Veerya* and *Vata-Pittashamak*²¹ properties, thereby correcting the agni and causes the *Vata AnulomnaGati* of *Apana Vayu* which is

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responsible for the regulation of urinary system. They also helps in *Pittashamana*, as in *Mutrakrichhra*, the main *Dosha* involved is *Pitta* which gets vitiated and needs to be pacified. *Yavakshara* possess *Madhura*, *Tikta*, *Kashaya Rasa*, *Laghu*, *Ruksha Guna* and *Sheeta Veerya*²². Substances having these properties are predominant in *Vayu* and *JhalaMahabhutas*. These properties are antagonist to *Ruksha*, and *Ushna* attributes, thus helps in reduction of *PittaVikara*. It also exhibit *Shodhana* and *Ropana* properties, thereby maintain an atmosphere which helps in preventing the multiplication of bacteria and also act as alkalizer due to presence of potassium salts²³.

CONCLUSION

The present study investigated the effect of administration of *Dhatrayadi Kwatha* and *Yavakshara* in the patients of *Mutrakrichhra*. The assessment was done on various subjective and objective parameters. From the present study, it can be concluded that the therapy given in Group-II patients i.e. *Dhatrayadi Kwatha* along with *Yavakshara* in comparison to Group-I (*Dhatrayadi Kwatha*) showed promising results in *Mutrakrichhra*. Maximum ingredients of the drug possess *Madhura*, *Kshaya Rasa*, *Snigdha*, *Laghu*, *Mridu Guna*, *Sheeta veerya*, *Tridoshahara*, *Vata-Pitta Shamana* properties, thereby pacify the *Pitta* and correct the *Gati* of *Apana Vayu* which is primarily involved in pathogenesis of *Mutrakrichhra*. Hence, alleviates

the symptoms of *Mutrakrichhra* and maintain a state of equilibrium. No untoward effects of the drugs were noted during the trial and follow up period. The trial drugs are easily available, acceptable and cost effective. The drugs can be administered for a long time. So it can be concluded that *Dhatrayadi Kwatha* along with *Yavakshara* is effective in the management of *Mutrakrichhra*.

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