

A Clinical Study on *Brihat Dhatryadi Kashaya* in Lower Urinary Tract Infection

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Abstract—Urinary Tract Infection (UTI) is the most commonly encountered bacterial infection. It refers to the existence and multiplication of bacteria in the urinary tract. Although UTIs can occur in both men and women of any age, but are more prevalent in women due to anatomical differences. Approximately 3% of women are affected by UTIs at the age of 20, with the incidence increasing by about 1% per decade thereafter. In contrast, UTIs are relatively uncommon in men until after the age of 60, when prostatic bladder outflow obstruction becomes more common, thereby increasing infection risk. UTIs are generally classified based on infection location into Lower Urinary Tract Infections and Upper Urinary Tract Infections. Additionally, they can be categorized as complicated or uncomplicated depending on associated risk factors. The most frequent symptoms of Lower Urinary Tract Infections are increased urination frequency, dysuria (painful urination), a burning sensation while urinating, a sense of urgency, suprapubic pain or discomfort, and strangury (slow and painful urination in small amounts). The primary causative agents are Gram-negative bacteria, such as *Escherichia coli*, *Proteus mirabilis*, and *Klebsiella*, as well as Gram-positive organisms like *Staphylococcus saprophyticus* and *Pseudomonas* species. The symptoms of a urinary tract infection closely mirror those of *Mutrakrichra* as described in Ayurveda. The term *Mutrakrichra* refers to difficulty in urination, and the condition is commonly seen across all age groups. The clinical features (*Lakshanas*) of *Paittika Mutrakrichra*, in particular, show a strong correlation with those of a lower urinary tract infection. The formulation *Brihat Dhatryadi Kashaya*, referenced in the *Mutrakrichra Chikitsaprakarana* section of *Bhaishajyaratnavali*, was chosen for this study.

Keywords— *Brihat Dhatryadi Kashaya*; Lower Urinary Tract Infection; *Paittika Mutrakrichra*.

I. INTRODUCTION

Urinary Tract Infection is a prevalent condition affecting humans. The term includes a range of clinical conditions, such as asymptomatic bacteriuria, cystitis, prostatitis, and pyelonephritis¹. The clinical presentation, diagnosis, treatment, and prognosis of a UTI vary based on the causative organism, the location of the infection, and the urinary tract's structural and functional condition². Females are notably more prone to UTIs than males, except in infants and older adults. However, after the age of 50, prostatic hypertrophy often leads to urinary obstruction in men, resulting in a UTI incidence comparable to that in women¹. It is estimated that 50–80% of women will have at least one UTI in their lifetime¹. It affects any part of the urinary system, including the kidneys, ureters, bladder, and urethra³. If the infection is only in the bladder and urethra, it's called a Lower Urinary Tract Infection (LUTI)⁴. If it involves kidneys and ureters, it's an Upper Urinary Tract Infection (UUTI)⁴. Currently, antibiotics and various preventive measures such as avoiding unhygienic toilet facilities, increasing water intake, not suppressing the urge to urinate, and maintaining proper sexual hygiene are commonly used to manage Urinary Tract Infections (UTIs). However, bacterial resistance to many antibiotics has become increasingly common, with recurrence and resistance rates reaching up to 50%⁵.

Based on their signs and symptoms, Urinary Tract Infections (UTIs) can be categorized under the term *Mutrakrichra*. Among the different types, the symptoms of

Lower Urinary Tract Infections (LUTIs) closely resemble those of *Paittika Mutrakrichra*.

Effective, affordable, and widely accessible natural treatments with fewer side effects are crucially needed to address this challenge. For this study, the formulation *Brihat Dhatryadi Kashaya*, mentioned in the *Mutrakrichra Chikitsaprakarana* section of *Bhaishajyaratnavali*, was selected. It consisted of eight ingredients known for their *Pitta-shamaka* (*Pitta*-pacifying) and *Mutrala* (diuretic) properties, making it a suitable remedy for reducing the signs and symptoms of lower urinary tract infections⁶. The *Kashaya* was administered orally at a dose of 48 ml, twice daily morning and evening one hour before meals.

II. OBJECTIVES

1. To assess the effectiveness of *Brihat Dhatryadi Kashaya* in alleviating the clinical signs and symptoms of Lower Urinary Tract Infections, along with changes in relevant laboratory parameters.
2. To assess the impact of *Brihat Dhatryadi Kashaya* in reducing the signs and symptoms associated with *Paittika Mutrakrichra*.

III. MATERIALS AND METHODS

Total 25 clinically diagnosed and confirmed cases of Lower Urinary Tract Infection completed the current trial. The cases were selected from OP, Department of Kayachikitsa, Sree Narayana Institute of Ayurvedic Studies and Research Pangode Puthur Kollam. Specially prepared case performa was used to evaluate the patients during the study and follow up. Participants of both Gender who satisfy the inclusion

criteria in the age group of 18-60 years attending the OP, were selected for the study. They were subjected to clinical examination and investigation including Urine routine microscopic examination, Blood routine examination and RBS.

A. Study design

Interventional study with Pre and Post-test without a control group.

B. Inclusion criteria

1. Participants with:

- Yellow-coloured urine
- Dysuria
- Increased frequency of micturition.
- Burning micturition
- Urgency of micturition
- Stranguria
- Nocturia
- Suprapubic discomfort

Patients with 4 or more above symptoms will be selected for the study.

2. Patients with pus cells >6 and ≤30/HPF.

3. Age group 18 – 60 years.

C. Exclusion criteria

1. High grade fever.
2. Pregnancy and Lactation.
3. Uncontrolled Diabetes Mellitus.

D. Diagnostic criteria

1. Urine routine microscopic examination
2. Blood routine examination
3. RBS

E. Intervention

Participants received a detailed explanation about the study after providing written informed consent. The study involved a single group receiving the study drug for a duration of 7 days as per dosage. 48gms of *Brihat Dhatriyadi Kashaya Churna* were dispensed to participants in air-tight packets, with the date of manufacture labelled on them. Participants were advised to prepare *Kashaya* as per the preparatory method which was typed and supplied along with the packet. A total of 7 packets were given throughout the study period. Participants were advised to take 48ml of *Kashaya* with 6 gm sugar internally, morning and evening 1 hour before food. The assessment was conducted on days 0, 8, and 15, during which changes in both subjective and objective parameters were documented. The results thus obtained were statistically analysed.

F. Criteria for assessment

All the participants selected for the current study were assessed on following parameters on 0th, 8th and 15th day of treatment to work out the efficacy of the treatment produced in participants.

a. Subjective improvement

A specific rating scale for subjective parameters was utilized to assess the efficacy of the treatment. Changes found in signs and symptoms like Yellow-coloured urine, Dysuria, Increased frequency of micturition, Burning micturition, Urgency of micturition, Stranguria, Nocturia, Suprapubic discomfort related to *Paittika Mutrakrichra*

b. Objective improvement

Urine routine microscopic examination on the 0th, 8th and 15th day.



Fig 1. *Brihat Dhatriyadi Kashaya Churnam*

TABLE 1. Parts used and quantity of each ingredient in one packet of *Kashaya Churna*

Sl.no	Sanskrit name	Parts used	Quantity
1	<i>Dhatri</i>	Fruit	6 gm
2	<i>Draksha</i>	Fruit	6 gm
3	<i>Yashtimadhu</i>	Root	6 gm
4	<i>Vidarikandha</i>	Tuber	6 gm
5	<i>Gokshura</i>	Whole plant	6 gm
6	<i>Darbha</i>	Root	6 gm
7	<i>Ikshu</i>	Root	6 gm
8	<i>Abhaya</i>	Fruit	6 gm

G. Statistical analysis

Subjective and objective parameters were assessed and recorded on the 0th, 8th and 15th days. The results obtained were statistically analysed using Contingency Coefficient Analysis, Paired ‘t-test or

Wilcoxon signed rank test. Based on the distribution of data basic statistical methods were also applied. P value <0.05 was considered as the level of significance.

IV. OBSERVATION AND RESULTS

Comparison of Yellow Coloured Urine (Peethamutratha) under three time period

On the 0th day of the study, 18 participants had Severely yellow-coloured urine, 6 had Moderately yellow-coloured urine, 1 had Mild yellow-coloured urine, and none had Absence of yellow colour. By the 8th day, no participants had Severely yellow-coloured urine; 6 showed Moderate yellow colouring, 12 had Mild yellow colouring, and in 7 participants, yellow colouring was Absent. On the 15th day, all 25 participants exhibited Absence of yellow colouring in urine.

These findings indicate a significant reduction in the yellow coloration of urine over time. The statistical analysis yielded a p-value of 0.000, which is below 0.05, indicating

highly statistically significant results at the 5% level. Therefore, there was a statistically significant variation in the Grades of yellow-coloured urine across different time periods.

Comparison of Dysuria (Krichramutratha) under three time period

On Day 0 of the study, among 25 participants, none experienced Severe Dysuria, 11 had Moderate Dysuria, 14 had Mild Dysuria, and none were symptom-free. By Day 8, no participants reported Severe or Moderate Dysuria, 6 had Mild symptoms, and 19 had no symptoms. On Day 15, all 25 participants were free of Dysuria.

The p-value of 0.000 is below 0.05, indicating highly statistically significant results at the 5% level. This demonstrates a significant variation in the Severity of Dysuria across different time periods during the study.

Comparison of Frequency of Micturition (Muhurmutratha) under three time period

Among 25 participants, on Day 0, 5 had a Severely increased frequency of micturition, 16 had a Moderately increased frequency, 4 had a Mild increase, and none had an absence of symptoms. By Day 8, no participants reported Severe or Moderate increases in frequency; 15 had a Mild increase, and 10 showed no symptoms. On Day 15, all 25 participants reported no increase in the Frequency of Micturition, with no cases of Severe, Moderate, or Mild symptoms.

The p-value of 0.000 is below 0.05, indicating highly statistically significant results at the 5% level. This confirms a significant variation in the Severity of increased Micturition Frequency over time.

Comparison of Burning Micturition (Sadahamutratha) under three time period

Among 25 participants on Day 0, 13 participants reported Severe burning micturition, 10 reported Moderate, 2 reported Mild, and none were symptom-free. By Day 8, no participants reported Severe symptoms; 2 had Moderate, 18 had Mild, and 5 reported no burning micturition. On Day 15, none of the participants reported any level of burning micturition, all 25 participants were symptom-free.

The p-value of 0.000, which is less than 0.05. This demonstrates a statistically significant variation in the Grades of Burning micturition across the different time points.

Comparison of Urgency under three time period

Among the 25 participants, on Day 0 of the study, 1 participant reported Severe Urgency of Micturition, 8 reported Moderate Urgency, 15 reported Mild Urgency, and 1 participant had no Urgency. By Day 8, no participants reported Severe or Moderate Urgency; 3 had Mild Urgency, and 22 reported no Urgency. On Day 15, none of the participants reported any Level of Urgency, all 25 were symptom-free.

The p-value for this change was 0.000, which is below 0.05, indicating highly significant results at the 5% level. Therefore, a statistically significant variation was observed in

the Grades of Urgency of Micturition over the different time periods.

Comparison of Stranguria (Sarujamutratha) under three time period

Among the 25 participants, on Day 0 of the study, none reported Severe Stranguria, 2 had Moderate Stranguria, 14 had Mild Stranguria, and 9 participants were symptom-free. By Day 8, no participants had Severe or Moderate Stranguria; 1 had Mild Stranguria, and 24 reported no symptoms. On Day 15, all participants were free of Stranguria.

The p-value was 0.000, which is less than 0.05, indicating a highly significant difference. Therefore, there was a statistically significant change in the Grades of Stranguria across the different time points.

Comparison of Nocturia under three time period

On Day 0 of the study, among 25 participants, none exhibited Severely increased Nocturia. At that time, 1 participant had Moderate Nocturia, 16 had Mild Nocturia, and Nocturia was Absent in 8 participants. By Day 8, Nocturia was Absent in all 25 participants, with no cases of Mild or Moderate Nocturia reported. Similarly, on Day 15, all participants continued to show no signs of nocturia.

The p-value for this data is 0.000, indicating highly significant results at the 5% level. Therefore, a statistically significant variation was observed in the Grades of Nocturia across the different time periods.

Comparison of Suprapubic Discomfort under three time period

Among the 25 participants, on Day 0 of the study, 1 participant experienced Severe suprapubic discomfort, 2 had Moderate discomfort, 19 had Mild discomfort, and 5 reported no discomfort. By Day 8, there were no cases of Severe or Moderate suprapubic discomfort; Mild discomfort was present in 2 participants, while 23 participants had no discomfort. On Day 15, all participants reported an absence of suprapubic discomfort.

The p-value for this data is 0.000, which is below 0.05, indicating highly significant findings at the 5% level. Therefore, a statistically significant variation was observed in the Grades of Suprapubic discomfort across the three time points.

Comparison of pre and post values of Pus Cells of the participants

The mean value on the 0th day is 16.60, the 8th day is 6.92 and the 15th day is 3.52. The mean difference on the 8th day is 9.68 (58.30%) and on the 15th day is 13.08 (78.80%). This means that there is a significant difference in the average pus cell values in the three different time periods. On the 8th day, the Standard deviation and Standard error are 10.33 and 2.07 respectively. Similarly, the 15th-day Standard deviation and Standard error are 8.11 and 1.62 respectively. The paired t value at 8th day is 4.683 and 15th day is 8.066. The data is significant at 5% level of significance for 8th day and is highly significant for 15th day, as per the table. The p value on the 8th day is 0.000 and 15th day is 0.000, which are less than

0.05. So we reject the Null hypothesis. That is there is a significant difference between pre and post Pus Cell values.

Comparison of pre and post values of Epithelial Cells of the participants

The mean value on the 0th day is 20.04, the 8th day is 9.24 and the 15th day is 6.64. The mean difference on the 8th day is 10.80 (53.89%) and on the 15th day is 13.40 (66.87%). This means that there is a significant difference in the average Epithelial cell values in the three different time periods. On the 8th day, the Standard deviation and Standard error are 12.91 and 2.58 respectively. Similarly, the 15th-day Standard deviation and Standard error are 12.25 and 2.45 respectively. The paired t value at 8th day is 4.180 and 15th day is 5.47. The data is significant at 5% level of significance for 8th day and is highly significant for 15th day, as per the table. The p value on the 8th day is 0.000 and 15th day is 0.000, which are less than 0.05. So we reject the Null hypothesis. That is there is a significant difference between pre and post Epithelial Cell values.

Comparison of Bacteria under three time period

On the 0th day in 20 participants bacteria was Absent and in 5 participants bacteria was Present. On the 8th and 15th day Bacteria was Absent in all participants.

TABLE 2. Comparison of Yellow Coloured Urine under three time period

Variables		Duration					
		0 th Day		8 th Day		15 th Day	
		n	%	n	%	n	%
Yellow Coloured Urine	Absent	0	0	7	28	25	100
	Mild	1	4	12	48	0	0
	Moderate	6	24	6	24	0	0
	Severe	18	72	0	0	0	0
	Total	25	100	25	100	25	100

TABLE 3. Comparison of Dysuria under three time period

Variables		Duration					
		0 th Day		8 th Day		15 th Day	
		n	%	n	%	n	%
Dysuria	Absent	0	0	19	76	25	100
	Mild	14	56	6	24	0	0
	Moderate	11	44	0	0	0	0
	Severe	0	0	0	0	0	0
	Total	25	100	25	100	25	100

TABLE 4. Comparison of Frequency of Micturition under three time period

Variables		Duration					
		0 th Day		8 th Day		15 th Day	
		N	%	n	%	n	%
Frequency	Absent	0	0	10	40	25	100
	Mild	4	16	15	60	0	0
	Moderate	16	64	0	0	0	0
	Severe	5	20	0	0	0	0
	Total	25	100	25	100	25	100

TABLE 5. Comparison of Burning Micturition under three time period

Variables		Duration					
		0 th Day		8 th Day		15 th Day	
		n	%	n	%	n	%
Burning Micturition	Absent	0	0	5	20	25	100
	Mild	2	8	18	72	0	0
	Moderate	10	40	2	8	0	0
	Severe	13	52	0	0	0	0
	Total	25	100	25	100	25	100

TABLE 6. Comparison of Urgency under three time period

Variables		Duration					
		0 th Day		8 th Day		15 th Day	
		n	%	n	%	n	%
Urgency	Absent	1	4	22	88	25	100
	Mild	15	60	3	12	0	0
	Moderate	8	32	0	0	0	0
	Severe	1	4	0	0	0	0
	Total	25	100	25	100	25	100

TABLE 7. Comparison of Nocturia under three time period

Variables		Duration					
		0 th Day		8 th Day		15 th Day	
		n	%	n	%	n	%
Nocturia	Absent	8	32	25	100	25	100
	Mild	16	64	0	0	0	0
	Moderate	1	4	0	0	0	0
	Severe	0	0	0	0	0	0
	Total	25	100	25	100	25	100

TABLE 8. Comparison of Stranguria under three time period

Variables		Duration					
		0 th Day		8 th Day		15 th Day	
		n	%	n	%	n	%
Stranguria	Absent	9	36	24	96	25	100
	Mild	14	56	1	4	0	0
	Moderate	2	8	0	0	0	0
	Severe	0	0	0	0	0	0
	Total	25	100	25	100	25	100

TABLE 9. Comparison of Suprapubic Discomfort under three time period

Variables		Duration					
		0 th Day		8 th Day		15 th Day	
		n	%	n	%	n	%
Suprapubic Discomfort	Absent	5	20	23	92	25	100
	Mild	19	68	2	8	0	0
	Moderate	2	8	0	0	0	0
	Severe	1	4	0	0	0	0
	Total	25	100	25	100	25	100

V. DISCUSSION

The study highlights the significant reduction in the signs and symptoms like yellow coloured urine, Dysuria, burning micturition, stranguria, nocturia, Urgency of micturition, suprapubic discomfort, Increased frequency of micturition. *Peethamutratha* is considered one of the common associated features of *Mutrakrichra*, especially when it is *Pittaja* (*Pitta*-dominant) in nature. Aggravated *Pitta* increases the heat in the *Mutravaha Srotas* (urinary channels). This heat burns or intensifies the colour of urine, turning it *Peethavarnatha*. Since the studied medicine contains drugs with *Madhura*, *Tikta*, and *Kashaya Rasas*, along with *Seeta Veerya* and *Madhura Vipaka*, it helps in pacifying *Pitta dosha*, which in turn leads to a reduction in the increased yellow colouration (*Peethavarnatha*) of urine⁷. As the drug possesses *Vatanulomana*, *Tridosahara*, and *Mutrala properties*, it helps in alleviating the pain experienced during micturition⁸. *Gokshura* in *Brihat Dhatriyadi Kashayam* has *Vatanut* and *Bastisulahara property* which helps in reduction of *Saruja Mutratha*⁹. *Abhaya* has *Sulahara property* which helps in reduction of pain. The ingredients of *Brihat Dhatriyadi Kashaya* possess *Madhura*, *Tikta*, and *Kashaya Rasa*, along with *Seeta Veerya* and *Madhura Vipaka*. It helps in reduction of *Pitta Dosas*⁷. *Dahasamana property* of *Dhatri*,

Vidarikandha, *Darbha* also helped in the reduction of *Sadahamutratha*. therapeutic effects of drugs like *Vidarikandha*, *Darbha*, and *Ikshu*, which possess *Mutrakrichrahara* (urinary obstruction-relieving) properties, thereby aiding in the reduction of *Krichramutratha*⁹. The study drug, containing *Katu Rasa* and exhibiting *Sophahara* (antiinflammatory) properties, helped reduce this symptom. Additionally, ingredients like *Dhatri*, *Yashtimadhu*, and *Abhaya*, known for their *Sophahara* action, further contributed to the alleviation of *Muhurmutratha*. Pus cells indicate the presence of inflammation and infection, which correspond to vitiated *Pitta* (heat/inflammation) and *Kapha* (mucous/pus). *Pitta Dosha* causes burning sensation, inflammation and *Kapha Dosha* leads to pus formation. Pus Cells means *Puya* in *Mutra*. In Ayurvedic terms, the presence of bacteria in urine can be linked to *Adrishta Krimi*-invisible organisms. *Krimi* encompasses both visible and invisible pathogens, and their presence indicates vitiation of the *Mutravaha Srotas*, primarily due to imbalances in *Pitta* and *Kapha Dosha*, accumulation of *Ama*, and the presence of *Krimi* (particularly *Adrishta Krimi*). In this study, the *Krimighna* (antimicrobial) property of *Abhaya*, combined with the *Kaphapittashamana* (balancing *Pitta* and *Kapha*) properties of *Dhatri*, *Darbha*, and *Abhaya*, contributed to the reduction of bacteria in participants who initially showed bacterial presence⁷. *Kashaya* (astringent), *Tikta* (bitter), and *Madhura* (sweet) *Rasas* are effective in pacifying *Pitta Dosha*, while *Katu* (pungent), *Tikta* (bitter), and *Kashaya* (astringent) *Rasas* help in pacifying *Kapha Dosha*. *Puya Upashoshana Karma* of *Tikta Rasa* and *Kleda Upashoshana* of *Tikta* and *Kashaya Rasa* helps in the reduction of pus cells in the urine⁷.

VI. CONCLUSION

The present clinical trial concludes that *Brihat Dhatriyadi Kashaya* is effective in the management of Lower Urinary Tract Infections (LUTIs). Significant improvement was observed in clinical symptoms including Yellow-coloured urine, Dysuria, Increased frequency of micturition, Burning micturition, Urgency of micturition, Stranguria, Nocturia, Suprapubic discomfort as well as laboratory findings such as pus cells, epithelial cells and bacteria in urine. Further controlled clinical trials with large sample sizes and long duration are recommended.

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