



ANTI-BACTERIAL EFFECT OF MUTRAVIRECHANIYA MAHAKASHAYA VIS- A -VIS URINARY TRACT INFECTION

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Abstract

An infection in any part of the urinary system i.e., kidney, bladder, ureter or urethra is called as urinary tract infection. The uropathogens causing the UTI vary by clinical syndrome are usually enteric gram-negative rods that have migrated to the urinary tract. The susceptibility patterns of these organisms vary by clinical syndrome. E. coli is the most common causative organism for the urinary tract infection. In facts 75 to 90% of urinary tract infections are caused by E. coli followed by Klebsiella, Staphylococci, pseudomonas and proteus in decreasing order. Mutravirechaniya Mahakashaya explained in Shadvirechanashatashritiyam Adhyayam of Charaka Samhita found to be effective on UTI caused by these specific bacteria.

Objectives – To evaluate the efficacy of Mutravirechaniya Mahakashaya on bacteria effected Urinary tract infection through In Vivo study.

Method – Total 50 subjects were intervened for the study and administered with Mutravirechaniya Mahakashaya. Efficacy outcomes were assessed through subjective and objective parameters.

Result – The Mutravirechaniya Mahakashaya found to be more effective in curing subjective parameters like burning micturition with p value of 0.001, painful micturition and with p value of 0.001, difficulty in Micturition with p value of 0.001. The result was also significant in objective parameter i.e., reducing the number of pus cells with p value of 0.001.

Conclusion – The action of Mutravirechaniya Mahakashaya has analyzed by its antibacterial and diuretic action.

Keywords –Urinary Tract Infection, Mutravirechaniya Mahakashaya, E. coli, Klebsiella, Staphylococci, Antibacterial and Diuretic.

Introduction

Urinary tract infection is the second common type of infection effecting the population. The prevalence rate of urinary tract infection in India is 3.3 %.¹ An infection in any part of the urinary system i.e., kidney, bladder, ureter or urethra is called as urinary tract infection.² UTI may be asymptomatic or symptomatic. Thus, the term urinary tract infection encompasses a variety of clinical entities, including asymptomatic bacteriuria, cystitis, prostatitis and pyelonephritis. The uropathogens causing the UTI vary by clinical syndrome are usually enteric gram-negative rods that have migrated to the urinary tract. The susceptibility patterns of these organisms vary by clinical syndrome. The most common pathogenic organism in UTI is Escherichia coli (in 75-90% of cases) followed in decreasing frequency by klebsiella, staphylococci and pseudomonas and proteus.³ Patients with urinary tract infection present with symptoms such as, Dysuria, hematuria, burning micturition, incontinence and retention of urine, urgency to micturate and pain over the loin and suprapubic region.⁴

Mutravirechaniya Mahakashaya

Acharya Charaka has explained Panchashanmahakashaya, which are useful in diseases of various system of the body in Shadvirechanasatashritiyam Adhayam.⁵ Mutravirechaniya Mahakashaya is thirty fifth Gana of these Mahakashaya. A group of ten drugs possessing Mutravirechaniya as a common Karma is termed as Mutravirechaniya Mahakashaya. The drugs mentioned under Mutravirechaniya Mahakashaya are Vrukshadani (Pueraria tuberosa), Swadamstra (Tribulus terrestris), Vasuka (Calotropis gingatea), Vashira (Achyranthes aspera), Pashanabheda (Bergenia lingulate), Darbha (Imperata cylindrica), Kusha (Desmostachya bipinnata), Kasha (Saccharum spontaneum), Gundra (Tinospora cardifolia), and Ithkatamula (Saccharum Munja).⁶

Chemical composition of Mutravirechaniya Mahakashaya Dravyas

Table No.1 Chemical composition of Mutravirechaniya Mahakashaya Dravyas	
Drug Name	Chemical composition
Vrukshadani	Pterocarpan one, Hydroxy tuberos one, Anhydrotruberosin, Coumestan – Tuberos tan, beta- sitosterol, Stigmasterol. ⁷
Swadamshttra	Chlorogenin, Diosgenin, Gitogenin, Rutin Campesterol, Beta- sitosterol, stigmasterol, Neotigogenin Astragalin, Dioscin, Diosgenin, Hecogenin, Ruscogenin. ⁸
Vasuka	Gigantea- Laurane, Beta-amyrin, cyanidin-3 rhamnoglucoside, Isovalerate, Giganteol, Calotroposide, Calactin, Calotoxin, Calotropins ⁹
Vashira	Betaine, Achyranthine, Hentriacontane, Ecdysterone, Achyranthus saponins. ¹⁰
Pashanabheda	contain alkaloids, steroids, flavonoids, terpenoids, tannins, glycosides, carbohydrates, and saponins. Beta sitosterol, stigmasterol, tannic acid. berginin and Afzelechin. ¹¹
Darbha	Triterpenoids, Cylindrin, Araundin, Fernenol, Isoarborinol, Simiarenol ¹²
Kusha	Coumarins, amino acids, carbohydrates, flavonoids, sterols, terpenes, and triterpenoids. ¹³
Kasha	kaempferol 3-0 rutinoside Isorhamnetin 3-0 neohesperidosides, typhaeosides. ¹⁴
Gundra	Clerodane furano diterpenes like columbin, Tinosporasid, a lignan, 3.4 bis- Tetrahydropuron, alkaloid like- Jatrorrhizine, Palmatine, Berberine, Tembeterine, sesquiterpene glucosides- Tinocorddifoliosides, Tinosporal and Tinosporan. ¹⁵
Ithkatamula	Isoborneol, Simiarenol ¹⁶

Materials and Methods

The study was open labelled, purposive and single centered study. A clinical study with 50 patients fulfilling the inclusion criteria with respect to age, irrespective of Gender, caste, religion and socioeconomic status approaching OPD & IPD of Government Ayurveda Medical college and Hospital Mysuru, Hitech Pancha karma hospital, and camps conducted in and around the Mysuru were selected for the study.

Inclusion criteria –

- Subjects of age Group 20-50 years.
- Burning sensation while micturition associated with pain
- Presence of pus cells in the urine more than 5
- Incomplete and frequent micturition

Exclusion criteria

- Patients having other renal disorders and BPH
- Females during their menstruating period.
- Pregnant and lactating women
- Patients above the Age of 50yrs
- Patients having other systemic disorders which interfere the intervention

Diagnostic Criteria:

Subjective parameters –

- Burning sensation while micturition associated with pain,
- Incomplete and frequent micturition.

Objective parameters: - Presence of pus cell more than 5 in urine.

Intervention – In this study all the ten drugs of Mutravirechaniya Mahakashaya were taken together in the form of Kashaya and administered 30ml bd for 7 days of duration to subjects falls under the diagnostic criteria.

Assessment Criteria:

The result was evaluated by subjective and objective parameters mainly based on clinical observation by grading method and laboratory values, before treatment on the 0th day and after treatment on 8th day.

Subjective parameters***Sadaha Mutrapravrutti (burning sensation)***

G0 – No burning sensation

G1 – Mild burning sensation at the end of micturition

G2 – Moderate burning sensation in the beginning of micturition and persist for few minutes.

G3- Severe burning sensation from the beginning of micturition and persist for few hours.

Sashoola Mutrapravrutti (painful micturition)

G0 – No pain

G1 – Mild pain at the end of micturition

G2- Moderate pain in the beginning of micturition and persist for few minutes.

G3 – Severe pain from the beginning of micturition and persist for few hours.

Muhurmuhur Mutrapravrutti (Frequent Micturition)

G 0 - Frequency of micturition with respect to Prakruti and Kala

G1-Frequency has increased 1 ½ times more than normalcy

G2- Frequency has increased 2 times more than normalcy

G3 - Frequency has increased more than 2 1/2 times of normalcy

Krichra Mutrapravrutti (difficulty in micturition) (observational parameter)

Present/ Absent

Statistical Analysis:

Collected data was analyzed by applying the statistical methods viz;

Descriptive statistics – Frequency, Percentage, Mean, Standard Deviation

Inferential statistics - Chi- Square test

Observations

The observation has done in two stages

1. Observation on demographic data
2. Observation related to disease

Observation on demographic data

In the present study, limitation of age was 20 years to 50 years. For the purpose of observation age group was divided in to 3 slabs. out of the 50 subjects, 16(32.0%) subjects belonged to age group of 20-30 years, 23(46.0%) subjects belonged to the age group of 31-40 years and 11(22.0%) subjects belonged to the age group of 41-50years.

In the present study, incidence of gender showed that females (62%) were more prone to UTI compare to male (38%). This is due to their short urethra, which makes the entry of bacteria easier into the urinary tract. Use of birth control measures are one among other reasons. The contraceptive like diaphragm and spermicidal condoms can kill the healthy bacteria, that protect from bacteria like E. Coli.

In the present study incidence of UTI were observed more in subjects from LSES (54%) than middle (34%) and upper (12%) SES. Exposure to excessive physical exercise without sufficient water intake and malnutrition might be the reason for this.

Subjects from, both rural (56%) and urban (44%) area were equally prone for UTI. Insufficient water intake was observed in subjects of both localities. Excessive physical exercise and malnutrition in rural habitants and life style of subjects residing in urban area may be the reason for this.

The subjects with excessive physical work (44%) were prone for UTI. The excessive physical work without sufficient intake of water, cause dehydration and decreased urine output, that favors' the growth of bacteria in urinary tract and give rise to UTI.

OBSERVATION ON DISEASES

The incidence of UTI was more in subjects with reduced water intake (40%) i.e., less than 1liter/day. Reduced water intake causes dehydration and decreased urine output. Excretion of urine helps to eradicate the bacteria, sticks on to the walls of urethra and bladder. Due to reduced output and volume of urine, bacteria attain a favorable environment to grow in the urinary tract.

In the present study more incidence was noticed in *Vata-pitta Prakruti*(46%)than *Vatakapha*(38%) and *Pittakapha*(16%)*Prakruti* .*Vata* and *Pitta* plays a major role in pathogenesis of *Mutrakrichra*. Thus, the disease is more prevalent in *Vata- Pitta Prakruti* person.

In the present study, Aharaja Nidanas like, *Adhyashana*(46%), *Ajeernabhojana*(38%), *Atimamsa Sevana* (38%) were noticed more. All these *Nidanas* leads to severe *Agnidusti* and *Ama* formation.

The incidence of UTI has noticed in subjects habituated to *Atiprustayana*.The *Atiprustayana* (20%) in terms of excessive bike riding act as the *Mulasthanadustikara Nidana*, because of the excessive pressure over the Bladder region.

Among 50 subjects, Majority of subjects had, *Sadaha Mutrapravrutti* and *Saruja Mutrapravrutti*, *Krichra Mutrata*. *Sadaha Mutrapravrutti* and *Saruja Mutrapravrutti* indicate the predominancy of *Pitta Dosha*. *Krichra Mutrata* suggest vitiation of both *Pitta* and *Vayu*.

OBSERVATION AND DISCUSSION ON RESULT

Results were assessed based on specific parameters before and after the intervention. Results are presented systematically by adopting appropriate statistical test.

Effect of intervention on Burning Micturition

Table No. 02- Effect of intervention on Burning Micturition					
Burning micturition	Category	Before intervention		After intervention	
		Frequency	Percentage	Frequency	Percentage
	None	4	8%	26	52%
	Mild	4	8%	19	38%
	Moderate	33	66%	5	10%
	Severe	9	18%	0	0%
Total		50	100%	50	100%
PEARSON CHI- SQUARE TEST – SIGNIFICANT VALUE - .001					

Before intervention, 4(8.0%) subjects were not having Burning sensation and after intervention 26(52.0%) subjects were not having burning micturition. This is indicating that the intervention was highly significant with p Value 0.001. The Anti - inflammatory properties of *Vasira*, *Pashanabheda*, *Kusha Kasha* and *Gundra* help to relieve the symptoms.

Effect of intervention on painful micturition

Table No. 03- Effect of intervention on painful micturition					
Painful micturition	Category	Before intervention		After intervention	
		Frequency	Percentage	Frequency	Percentage
	None	7	14.0%	37	74%
	Mild	18	36.0%	13	26%
	Moderate	25	50.0 %	0	0%
	Severe	0	0.0%	0	0%
Total		50	100.0%	50	100%
PEARSON CHI SQUARE TEST- SIGNIFICANT VALUE - .001					

Before intervention 7(14.0%) subjects were not having pain during micturition and after intervention 37(74.0%) subjects were not having painful micturition. This is indicating that the intervention was highly significant with p value 0.001. The Analgesic property of *Vasuka* and Anti-inflammatory property of *Vasira*, *Pashanabheda*, *Kusha Kasha* and *Gundra* help to relieve the symptoms.

Effect of intervention on frequency of micturition

Table no. 04- Effect of intervention on frequency of micturition					
Frequency of Micturition	Category	Before intervention		After intervention	
		Frequency	Percentage	Frequency	Percentage
	None	33	66.0%	44	88%
	Increased 1 ½ time	10	20.0%	6	16%
	Increased 2 times	7	14.0%	0	0.0%
	Increased 2 ½ time	0	0.0 %	0.	0.0%
Total		50	100.0%	50	100.0%
PEARSON CHI SQUARE TEST- SIGNIFICANT VALUE - .008					

Before intervention 33(66.0%) subjects had frequency of micturition with respect to *Prakruti* and *Kala* and after intervention 44(88.0%) subjects had normal frequency of Micturition with respect to *Prakruti* and *Kala*. The intervention was not significant statistically with p value of 0.008, but clinically it was significant. The subjects with incomplete micturition reported complete voiding of urine with regular frequency after the intervention. The Diuretic action of *Vrukshadani*, *Swadamstra*, *Pashanabheda*, *Darbha*, *Kusha*, and *Kasha*, helps to corrects the stream and increases the frequency of urine.

Effect of intervention on difficulty in micturition

Table No. 05- Effect of intervention on Difficulty in micturition					
Difficulty in micturition	Category	Before intervention		After intervention	
		Frequency	Percentage	Frequency	Percentage
	Absent	23	46.0%	48	96.0%
	Present	27	54.0%	2	4.0%
Total		50	100.0%	50	100.0%
PEARSON CHI SQUARE TEST- SIGNIFICANT VALUE - .001					

Before intervention 23(46.0%) subjects were not having difficulty in micturition and after intervention 48(96.0%) subjects were not having difficulty in micturition. This shows intervention was highly significant with p value 0.001. The anti- inflammatory action and analgesic property of *Dravyas* helps to relieve the symptoms.

Effect of intervention on pus cells

Table No.06 Effect of intervention on pus cells					
Pus cells in urine	Category	Before intervention		After intervention	
		Frequency	Percentage	Frequency	Percentage
	Absent	14	28.0%	33	66.0%
	Present	36	72.0%	17	34.0%
Total		50	100.0	50	100.0%
PEARSON CHI SQUARE TEST- SIGNIFICANT VALUE - .001					

Pus cells in Urine

Before intervention 14(28.0%) subjects were not having pus cells in urine and after intervention 33(66.0%) subjects were not having pus cells in their urine. This shows the intervention was highly Significant. The Diuretic action and Antibacterial activity of, *Swadamstra*, *Pashanabheda*, *Vasuka*, *Vashira* and *Gundra* helps to reduce the number of pus cells in urine.

Conclusion

Micro- organism plays a major role in pathogenesis of UTI, in the present scenario the world is looking for an alternative medicine. The Mutravirechaniya Mahakashaya by the virtue of its chemical composition act as antibacterial and Diuretic. The effect of Mutravirechaniya Mahakashaya was found to be highly significant on burning micturition with p value of 0.001 and painful micturition with p value of 0.001 and difficulty in micturition with p value of 0.001. Mutravirechaniya Mahakashaya was found to be highly significant on reducing the number of pus cells with p value of 0.001. So it can be utilized in subjects with these specific bacteria effected urinary tract infection.

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