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CRITICAL EVALUATION OF THE ACTION OF VARIVIDARYADI KASHAYA IN LOWER URINARY TRACT INFECTIONS

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ABSTRACT

Urinary tract infection (UTI) is a common and painful human illness that is rapidly responsive to modern antibiotic therapy. UTI is caused by both Gram-negative and Gram-positive bacteria, as well as by certain fungi. The typical symptoms of lower urinary tract infections (LUTI) are dysuria, urinary frequency, and urgency, nocturia, hesitancy, suprapubic discomfort, and gross hematuria. The features of LUTI can be found under the heading *Pittaja Mutrakrichra Lakshana*. As *Pitta* and *Vata* are the main *Doshas* involved in the *Samprapti* of this disease, drugs having *Madhura Rasa*, *Vata-Pitta Samana* properties are the ideal choice for the treatment. In *Varividaryadi Kashaya*, all the drugs are having *Sita Virya* and most of the drugs are having *Madhura Rasa*, *Guru- Snigdha Guna*, and *Madhura Vipaka*. So, there is a very need to understand the scope of the usage of *Varividaryadi Kashaya* in the management of LUTI.

Keywords: Urinary tract infection, *Pittaja Mutrakrichra*, *Varividaryadi Kashaya*

INTRODUCTION

Urinary tract infections (UTI) are some of the most common bacterial infections, affecting 150 million people each year worldwide[1]. The features of UTI can be found under the heading *Pittaja Mutrakrichra Lakshanas*. As *Pitta* and *Vata* are the main Doshas involved in the *Samprapti* of the disease, drugs having *Madhura Rasa*, *Vata-Pitta Samana* properties are the ideal choice for the treatment and in *Varividaryadi Kashaya*, all the drugs are having *Sita Virya* and most of the drugs are having *Madhura Rasa*, *Guru-Snigdha Guna*, and *Madhura Vipaka*. So, there is a very need to understand the scope of the usage of

Varividaryadi Kashaya in the treatment of lower urinary tract infections.

DISEASE REVIEW

Urinary tract infection (UTI) is a common and painful human illness that, fortunately, is rapidly responsive to modern antibiotic therapy. UTI may be asymptomatic (subclinical infection) or symptomatic (disease). Thus, the term UTI encompasses a variety of clinical entities, including asymptomatic bacteriuria (ASB), cystitis, prostatitis, and pylelonephritis[2]. UTI is caused by both Gram-negative and Gram-positive bacteria, as well as by certain fungi. The most common causative agent for both uncomplicated and complicated UTI is uropathogenic *Escherichia coli* (UPEC) and is followed in prevalence by *Klebsiella pneumonia*, *Enterococcus faecalis*, *Pseudomonas aeruginosa*, *Staphylococcus aureus* and several species of *Candida*. Several risk factors are associated with cystitis/lower urinary tract infection (LUTI), including female gender, a prior UTI, sexual activity, vaginal infection, diabetes, obesity and genetic susceptibility. A LUTI typically starts with periurethral contamination by an uropathogen residing in the gut, followedby colonization at the urethra and subsequent migration of the pathogen to the bladder. In the bladder, the consequences of complex host-pathogen interactions ultimately determine whether uropathogen are successful in colonization or eliminated[1]. The typical symptoms of cystitis are dysuria, urinary frequency, and urgency. Nocturia, hesitancy, suprapubic discomfort, and gross hematuria are also noted[2]. Currently, antibiotics — such as trimethoprim sulfamethoxazole, ciprofloxacin and ampicillin — are the most commonly recommended therapeutics for UTI[1]. However, UTIs are becoming increasingly difficult to treat owing to the widespread emergence of antibiotic resistance mechanisms and high recurrence rates.

In Ayurveda, UTI can be correlated with *Mutrakrichra*. The disease in which *Mutra* is passed with difficulty is called *Mutrakrichra*[3]. As burning micturition is the predominant symptom of LUTI which suggests the involvement of *Pitta Dushti* in the manifestation of this disease; also, the symptoms such as *Peeta Mutrata, Sarakta Mutra, Sadaha, Saruk, Krichra* and *Muhur Mutra* can be seen in this condition; so, it can be correlated with *Pittaja Mutrakrichra*.

Nidana

Mutrakrichra Nidana has been very well explained by *Acharya* Charaka. But *Acharya* Susrutha and *Acharya* Vagbhata has not mentioned any special *Nidana* for *Mutrakrichra*. They have considered *Asmari* and *Shalya* as the etiological factors. The *Nidana* can be divided into *Samanya Nidana* and *Vishishta Nidana*. Etiological factors that cause the vitiation of *Mutravaha Srotas* can be taken as the *Samanya Nidana*. According to *Acharya* Charaka, *Mutravaha Srotas* gets vitiated because of the intake of drinks or foods, or sexual intercourse while having the urge for micturition; and suppression of the urge for micturition especially by those suffering from wasting and injury[4]. *Vishishta Nidana* - *Aharaja Nidana* like *Rooksha Ahara*, *Madhyasevana*, *Anoopa Mamsa Sevana*, *Matsyasevana*, *Adhyasana*, *Ajeerna Bhojana*, *Katu*, *Amla*, *Lavana Rasa Ati Sevana*, *Viharaja Nidana* like *Ativyayama*, *Nityadrutaprushta Yana*, *Sthreesevana*, *Vegadharana* and *Oushadhajanya Nidana* like intake of *Teekshna Oushada* etc[5].

Samprapti

Due to the *Aharaja, Viharaja* and *Oushadhajanya Nidana Sevana*, *Pitta* and *Vata Dosha Prakopa* occurs in the body. This *Prakupita Pitta* and *Vata* result in *Agni Dushti* and ends in the formation of *Ama*. From this *Ama*, *Ama Yukta Rasa Dhatu* is formed. From this, *Dushita Rakta* gets formed and in turn produces *Mala Roopa Pitta* in excess. Because of the *Tikshna* and *Ushna Guna* of the *Mala Roopa Pitta, Kleda Soshana* occurs. Thus formed *Mutra,* from the *Kledamsha* of *Rakta* will also possess similar qualities and reaches *Basti* through the *Mutravaha Srotos*. As *Basti* provides the seat for *Apana Vayu;* because of its *Yogavahi Guna*, *Lakshanas* like *Peeta Mutrata, Daha, Ushna Mootrata, Krichra Mutrata* etc. are exhibited.

Table 1: *Samprapti Ghataka*

DOSHA	*Pitta, Vata*
DUSHYA	*Mutra, Rasa, Rakta*
AGNI	*Jatharagnimandya, Dhatvagnimandhya*
SROTAS	*Mutravaha, Rasavaha*
SRODUSHTI	*Sanga*
UDBHAVA STHANA	*Amashaya, Pakwashaya*
ADHISHTHANA	*Basti*
SANCHARA STHANA	*Mutravaha Srotas*
VYAKTHA STHANA	*Mutra Marga*
ROGAMARGA	*Madhyama*
SWABHAVA	*Ashukari, Cirakari*

VARIVIDARYADI KASHAYA

Varividaryadi Kashaya is mentioned in *Sahasrayogam Mutrakrichra Prakaranam*[6].

Table 2: Botanical identity and part used of the drugs[7-11]

DRUG	BOTANICAL NAME	FAMILY	PART USED
Satavari	*Asparagus racemosus* Willd.	*Liliaceae*	Tuber
Vidari	*Ipomea panniculata* Linn.	*Papilonaceae*	Tuber
Gokshura	*Tribulus terrestris* Linn.	*Zygophyllaceae*	Fruit
Musta	*Cyperus rotundus* Linn.	*Cypereceae*	Tuber
Sariva	*Hemidesmus indicus* Linn.	*Asclepiadaceae*	Tuber

Table 3: Properties of the drugs[7-10]

Drug	*Rasa*	*Guna*	*Virya*	*Vipaka*
Satavari	*Madhura Tikta*	*Guru, Snigdha*	*Sita*	*Madhura*
Vidari	*Madhura*	*Guru, Snigdha*	*Sita*	*Madhura*
Gokshura	*Madhura*	*Guru, Snigdha*	*Sita*	*Madhura*
Musta	*Tikta, Kashaya, Katu*	*Laghu, Ruksha*	*Sita*	*Katu*
Sariva	*Madhura*	*Guru, Snigdha*	*Sita*	*Madhura*

Table 4: Karma of the drugs[7-10]

DRUG	*KARMA*
Satavari	*Vrsya, Sukraja, Balya, Medhya, Rasayana, Kaphavataghna, Pittahara, Vatahara, Stanyakara, Hrdya, Netrya, Sukrala, Agnipushtikara*
Vidari	*Vatahara, Pittahara, Stanyada, Sukrala, Mutrala, Jivaniya, Rasayana, Brimhana, Svarya, Varnya, Balya, Vrsya*
Gokshura	*Vatanut, Vrsya, Brimhana, Asmarihara, Vastisodhana*
Musta	*Pittakaphahara, Sthoulyahara, Sothahara, Dipana, Pacana, Grahi, Trsnanigrahana, Krimighna, Tvakdoshahara, Jwaraghna, Visaghna*
Sariva	*Tridoshaghna, Dipana, Raktasodhana, Ama Nasana, Visaghna, Jwarahara*

DISCUSSION

Lower urinary tract infections begin when the uro-pathogen residing in the gut contaminate the periure-thral area and can colonize at the urethra. Then they migrate to the bladder and resulting in colonization. Host inflammatory responses, including neutrophil

infiltration, begin to clear extracellular bacteria. Either through host cell invasion or morphological changes, some bacteria evade the immune system and result in resistance to neutrophils. These bacteria undergo multiplication and biofilm formation. These bacteria produce toxins and proteases that induce host cell damage and releases essential nutrients that promote bacterial survival. If left untreated, it results in kidney colonization or even progress to bacteraemia[1].

In *Varividaryadi Kashaya*, all the drugs are having *Sita Virya* and most of the drugs are having *Madhura Rasa, Guru- Snigdha Guna,* and *Madhura Vipaka.* This may alleviate the vitiated *Pitta* in the *Pittaja Mutrakrichra*. The vitiated *Dosha* results in the reduced function of *Agni;* thus, the formation of *Ama* occurs. The *Dipana* and *Ama Pachana* properties of the *Kashaya* help in the *Ama Pachana, Agni Dipana* and thereby arrest the further formation of *Ama Yukta Rasa Dhatu.* In Ayurveda classics, *Gokshura* has been mentioned as *Vatahara* and *Mutrakrichrahara*[12]. This property will alleviate the vitiated *Vata Dosha* in the *Basti*. *Madhura Rasa - Vipaka* and *Snigdha Guna* of the *Kashaya* increases the *Kleda* in the body. *Kleda* increases the production of urine and thereby reducing the urine pH. The *Vasti Sodhana* and *Mutravirechaneeya* property of *Gokshura* helps in eliminating the excess *Kleda* produced, thereby the bacteria is pushed out from the bladder and reduce the inflammation.

The various activities and effects of the drugs can be explained on modern parameters as well by recent studies of their pharmacological actions. *Vidarikanda* contains sugar and due to their osmotic activity, these substances oppose the reabsorption of water from the glomerular filtrate. These substances produce more elimination of water than sodium and hence produce diuresis. Shatavarin 1, found in *Shatavari* and potassium nitrate in the *Gokshura* also causes diuresis[13]. By diuresis, there will be increased production of urine and that reduces the altered pH of the urine and the environment favourable for bacterial growth. From the antimicrobial studies, it was concluded that the essential oil of *Cyperus rotundus* rhizomes was active against gram-positive microorganisms and they also possess anti-inflammatory activity. The extracts of *C. rotundus* show anti-inflammatory activity[14]. The diuretic properties of *Tribulus terrestris* are due to the large quantities of nitrates and essential oil present in its fruits and seeds. The diuretic activity can also be attributed to the presence of potassium salts in high concentrations. Analgesic activities of *Tribulus terrestris* were studied and the study indicated that the methanolic extract of *Tribulus terrestris* at a dose of 100 mg/kg produced an analgesic effect. The methanolic extract of fruits of *Tribulus terrestris* is found to be most active against gram-positive and gram-negative bacteria[15]. Essential oil of *Hemidesmus indicus* also exhibited marked antibacterial activity against both grams positive and gram-negative bacteria but failed to show appreciable antifungal activity. Chloroform and ethanol (95%) extracts of *H. indicus* showed antifungal activity. The methanolic extracts of *Hemidesmus indicus* roots possess potential dose-dependent anti-inflammatory and anti-pyretic activity[16]. Methanolic extract of *Asparagus racemosus* shows antibacterial activity. Aqueous extract of the roots of *Asparagus racemosus* shows diuretic activity. The *in vitro* anti-candidal activity of *Asparagus racemosus* roots and tubers extract showed a high degree of activity against all the *Candida* strains[17]. By considering all these pharmacological properties of different ingredients of *Varividaryadi Kashaya*, we can understand the counteracting effect of the *Kashaya* on the pathophysiology of LUTI when it is administered.

CONCLUSION

Lower urinary tract infections can be correlated with *Mutrakrichra* especially *Pittaja Mutrakrichra. Varividaryadi Kashaya*, in which all the drugs are having *Sita Virya* and most of the drugs are having *Madhura Rasa, Guru- Snigdha Guna, Madhura Vipaka* and *Vata-Pitta Samana* property, helps in the *Samprapti Vighatana* of the disease. The *Vasti Sodhana* and *Mutravirechaneeya* effect of the *Gokshura* plays a very important role in the elimination of bacteria through urine.

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