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CLINICO-PATHOLOGICAL STUDY TO EVALUATE THE EFFECT OF VIDARYADI KWATH ON MICRO-ORGANISM CAUSING U.T.I. W.S.R. TO PITTAJA MUTRAKRICHHRA

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ABSTRACT
When there is any impairment in their normal function or impairment in *kledavahana* by *mutra* due to its vitiation by *doshas*, they in turn vitiate their marga and srotas which is called as *mutravahasrotodusti*. Urine is a liquid by-product of metabolism in our body. The cellular metabolism generates many by-products which are rich in nitrogen and must be cleared from blood stream, such as urea, uric acid, and creatinine. These by-products are expelled from the body during urination, which is the primary method for excreting water soluble waste products in the form of chemicals from the body. All the features of *Pittaja Mutrakrichha* like yellowish discoloration of urine, burning sensation during micturition, dysuria with increased frequency has close resemblance to UTI as described in modern texts especially with Lower Urinary tract Infection. Urinary tract infection is one of the commonest diseases encountered in routine practice that encompasses both asymptomatic microbial colonization of the urine and symptomatic infection with microbial invasion and inflammation of urinary tract. E. coli is the most common causative organism to cause UTI (80% cases). In pregnant females E.coli is the offending organism in over 90% cases. The incidence during pregnancy ranges from 2-10%. So, in the present study all the considerations of *Vidaryadi Kwath* has been chosen to see the effect on the patients of *Pittaja Mutrakrichha* (UTI).

KEYWORDS: UTI, Mutrakrichha, *Vidaryadi Kwath*, Anupan, Urine.

INTRODUCTION
Urinary diseases like any other group of diseases have afflicted humanity from the prehistoric era. The term *Mutrakrichra* means painful voiding of urine. *Krichrata* (dysuria) is the cardinal feature of *Mutrakrichra* and *vibandhata* (retention of urine) is an associated feature.[1] *Vedas* are the basis of earliest human knowledge. *Ayurveda* is known as *Upaveda* of *Atharvaveda*. *Atharvaveda* mentioned many urinary structures like ureters (g*avini*), urinary bladder (*vasti)*, urethra (m*ehana*) etc. *Puranas*, description of *mutra roga is found in Garuda* and *Agni Purana*. According to *Agni Purana*, *vrikka* are formed from *prasada bhaga* of *rakta* and *mamsa*.

In *Garuda Purana* there is separate chapter on *Mutrakrichra* describing physiology of urine formation & other diseases of *Mutravaha srotas*. In *Agni Purana,* the treatment of *Mutrakrichra* has been described as *kwatha* of *haritaki*, *gokshura*, *dusparsha*, *rajavriksha* and *shara* in equal quantity with *madhu.*[2] *Mutravaha srotas* & its diseases are vividly described in various *sthana* of *Charaka Samhita*. *Mutrakrichrahar Yavagu* has been described in *'Apamarga Tandu-liyam adhyaya'* of *Sutra Sthana.* Various drugs acting on urinary system such as *Mutrasangrahaniya* (urinary astringents*)*, *Mutravirechaniya* (Diuretics*)*, *Mutravirajaniya (*correction of pigments*) mahakshaya* has been explained in *'Shadvirechanshatiya adhyaya'*.[3,4,5] *Ikshu* is said to be best *Mutrajanan dravya* & *Gokshura* is said to be best *Mutra-krichrahar dravya.*[6] Equal quantity of *mishri* and *yava kshara* is described for the management of *Mutrakrichra.*[7] **Some other important formulations include:** *Varunadi kwatha***,** *Varunshigruadi kwatha***,** *Gokshuradi guggulu, Gokshuradi kwatha,*

Chandanasava, Chandraprabha vati, Trivikrama ras, Chandrakala rasa.[8]

In Kashyap Samhita childrens mutrakrichha described in Vedana adhyaya of Sutrasthana. Vagbhatta classified *mutraroga* primarily as *mutra-apravrittijanya* and *mutra-atipravrittijanya.* 20 types of *mutraroga* have been explained which includes 4 types of *Ashmari*, 4 types of *Mutrakrichra* and 12 types of *Mutraghata. In Sharangadhar samhita, Bhavprakash nighantu and Madhav Nidan, Mutrakrichra* has been classified into eight types.[9,10] *Chakradutta* has described the treatment of *Mutrakrichra* similar to that described in *Sushruta* and *Charaka Samhita*. Second part of this text deals with *pathya* and *apathya* in *mutraroga*.[11]

Dysuria refers to difficulty in urination whether it may be painful or burning micturition. Urinary tract infections are most common in young women with 10% of women getting an infection yearly and 60% having an infection at some point in their life. Nearly, 1 in 3 women have atleast 1 episode of UTI requiring anti-microbial therapy by the age of 24 yrs. UTIs are the second most common form of infection, accounting for nearly 25% of all infections. The condition rarely occurs in men who are younger than 50 years old and who did not undergo any genito-urinary procedure. The prevalence of bladder infections in pre-school and school going girls was 1-3% nearly 30-fold higher than that in boys. The seven epidemiologically defined prone to UTI are:

1. Children below 1 year of age.
2. Pre-school and school age girls.
3. Pre-menopausal women.
4. Men with prostatic or other causes of urinary tract obstruction.
5. Post-menopausal women.
6. Patients with indwelling urinary catheters.
7. Individuals with neurogenic bladder.

Dysuria may indicate urethritis, cystitis, U.T.I., urethral stricture, benign prostate hypertrophy, renal stones etc. It may also be due to certain medicines especially opiates and drugs used to prevent motion sickness. Infection is the main etiological factor which may cause dysuria. Bacteria are most commonly responsible, although, virus, fungi and yeast may also be the cause of UTI. The most common causative organisms of this disease are Escherichia coli and Staphylococci species. The others are Gram negative bacilli, including Proteus, Klebsiella spp. Enterobacter spp. and Pseudomonas spp. which are also responsible to some extent, especially in case of uncomplicated infections. Gram positive cocci also play major role in causing UTI in young patients, patients of urolithiasis and those who have a past history of instrumentation. UTI means significant bacteriuria existing due to growth of more than 10^5 organisms per ml in a cautiously collected and well transported mid stream urine sample[12].

In the series of all research work; present study is carried out with new *Ayurvedic* formulation i.e. "***Vidaryadi Kwatha*** (***Vidarikand****-Pueraria tuberose*, ***Gokshura***[1]*-Tribulus terrestris*, ***MadhuYashthi****- Glycyrrhiza glabra*, ***Nagkesar****- Mesuaferrea*, ***Madhu****-Honey)* for the management of ***Pittaja-Mutrakrichra***. this drugs are mentioned in '*Chakradutta'* and '*Bhaishajya Ratnawali'* in the management of *Mutrakrichra.*

MATERIAL AND METHODOLOGY

Selection of the patients

Patients of *Mutrakrichra* fulfilling all the inclusion criteria were registered from the OPD/IPD of Vaidya Yagya Dutt Sharma Ayurvedic College & P L R D Hospital, Khurja, Dist. Bulandshahar Uttar Pradesh. All the patients were managed at OPD level.These patients were screened with respect to symptoms, urine analysis, haematological and microbiological studies.

Inclusion criteria

1. Patients presenting with signs and symptoms of *Mutrakrichra* as described in *Madhava Nidan.*
2. Age above 16 years and below 50 years irrespective of sex, caste and religion etc.
3. Patients willing for the trial.
4. Ethical committee approval

Exclusion criteria

1. *Mutrakrichra* associated with complicating foreign bodies like indwelling catheter etc.
2. Associated with defects in voiding mechanism, incontinence of urine & atonic bladder.
3. Polycystic kidney, Hydronephrosis.
4. Impaired renal functions
5. Malignancy of urinary tract.

Investigational criteria

The following investigations were carried out to assess the general condition of the patients to include them in clinical trial and to rule out any pathology.

1. **Haematological investigations:-** The routine base-line haematological investigations were done in every case before and after the completion of clinical trial such as Hb gm%, TLC, DLC, ESR, etc.
2. **Biochemical investigations:-** Fasting Blood Sugar, Blood Urea and Serum Creatinine levels were done to rule out any renal disorder and any other pathologies.
3. **Urinalysis**

a. Physical examination

(i) Colour and appearance (ii) Reaction
(iii) Turbidity (iv) Blood
(v) Specific gravity (vi) Urine volume in 24hrs

b. Chemical examination

(i) Sugar
(ii) Protein (Albumin)

c. Microscopic Examination
(i) Pus Cells
(ii) RBC's
(iii) WBC's
(iv) Casts
(v) Crystals

4. **Urine culture:-** In every patient taken up for this clinical trial, urine culture was done. Mid-stream urine sample was recommended to the patients, to be collected under full aseptic conditions.
5. **Radiological Investigations:-** Ultrasonography of urinary system i.e. KUB was also done, wherever required.

Diagnostic Criteria
Diagnostic criterias were mainly based on the signs and symptoms of *Mutrakrichra* described in *Madhava Nidan.*

- **Subjective criteria:-** It was based on the signs and symptoms of *Pittaja Mutrakrichra* described in *Madhava Nidan.*
- *Krichha mutrata* (Difficulty in micturition)
- *Peeta mutrata*(Turbidity of urine)
- *Sarakta mutrata* (Haematuria)
- *Sadaha mutrata* (Burning Micturation)
- *Saruja mutrata* (Painful micturation)
- *Muhur-muhur mutrata* (Increased frequency of micturition).

Out of all the six features mentioned above, presence of atleast three clinical features was necessary to include the patients in clinical trial.

- **Vidaryadi Kwatha:-** All ingrideient was taken and then *yavakuta* (coarse powder) was done in the pharmacy of Vaidya Yagya Dutt Sharma Ayurved Mahavidyalaya Khurja Bulandshahar.

Dose – 50 ml B.D.

Anupana – Madhu (Bee Honey) 12gm mixed with *kwatha*
Duration of trial: - 21 days
Follow up: 28th day.

Instructions to the Patients
All the patients were advised about *pathya-apathya*.
✶ **Pathya**
The dietary and behavioural schedules advised to patients were:-

- Adequate fluid intake, approximately 2 litres per day.
- Fruits containing high water content.
- Maintenance of good perineal hygiene.
- Complete and frequent emptying of the bladder.
- Passage of urine before and after intercourse.

Assessment of the patients
Assessment of the effects of therapy was done on the basis of various subjective and objective criteria. Every patient was assessed one week after the commencement of the trial and after the completion of trial. Duration of the trial was 21 days. In first follow up the patients were assessed on clinical grounds only and appropriate investigations were also done, wherever it was necessary. The patients who did not turned up were considered drop out. After 21 days, detailed examination of the patients was carried out including all investigations.

Assessment criteria
To assess the various signs and symptoms, Scoring System was adopted.
a. Clinical Assessment
Subjective criteria - On the basis of clinical symptoms

i) *Saruja Mutrata* (Painful micturition)

No pain during micturition	0
Mild pain during micturition	1
Moderate pain during micturition	2
Severe pain during micturition	3

ii) *Muhur Muhur Mutrata* (Increased frequency of urine)

Patient passing urine 4-5 times a day	0
Patient passing urine 6-10 times a day	1
Patient passing urine 11-20 times a day	2
Patient passing urine >21 times a day	3

iii) *Sadah Mutrata* (Burning micturition)

No burning micturition	0
Mild burning micturition	1
Moderate burning micturition	2
Severe burning micturition	3

iv) *Peeta/Shweta Mutrata* (Turbid urine)

No cloudiness/clear urine	0
Definite cloudiness (without flocculation)	1
Granular cloudiness (without flocculation)	2
Dense opaque cloudy flocculation	3

v) *Krichra Mutrata* (Difficulty in micturition)

No difficulty during micturition	0
Difficulty at the beginning of the act	1
Difficulty at beginning & partially during rest of the act	2
Difficulty present throughout the act	3

v) *Sarakta Mutrata* (Haematuria)

No RBC /HPF in the urine	0
RBC 1+/HPF in the urine	1
RBC2++/HPF in the urine	2
RBC3+++/4++++/HPF in the urine	3

b. Investigational Assessment
Some of the laboratory findings were assessed by grading them and others were assessed simply evaluating the results obtained from them as follows:

i. Pus cells in urine Grade

0-5/ hpf	-	0
1+/hpf	-	1
2++/hpf	-	2
3+++/ hpf	-	3

ii. RBC's in urine

iii.	0-5 hpf	-	0
iv.	1+/hpf	-	1
v.	2++/hpf	-	2
vi.	3+++/ hpf	-	3

3. Urine Culture

Urine culture reports were assessed before & after completion of clinical trial.

4. ESR and TLC

These were also assessed by simply evaluating their value before and after completion of trial.

ASSESSMENT OF RESULTS

The patients were examined in every visit for pulse, B.P., temperature, urine output, turbidity, burning micturition, haematuria, frequency of micturition, and general condition. All the cases were subjected to clinical observation throughout the course of treatment. After 21 days, when the trial was completed, thorough examination of the patient was carried out including all investigations.

The effect of therapy was assessed on the basis of relief observed over the pre trial values and change in urine culture after the treatment. The assessment of results were classified into 4 groups on the basis of overall assessment of the therapy as listed below:-

a. Cured
b. Markedly improved
c. Mildly improved
d. Unchanged

This categorization was done on the basis of six cardinal symptoms of *Pittaja Mutrakrichra* w.s.r. to UTI i.e.

- ✶ *Saruja Mutrata* (Painful micturition)
- ✶ *Muhur-Muhur Mutrata* (Inreased frequency)
- ✶ *Sadah Mutrata* (Burning micturition)
- ✶ *Peeta/Shweta Mutrata* (Turbidity)
- ✶ *Sarakta Mutrata* (Haematuria)
- ✶ *Krichra Mutrata* (Difficulty during micturition)

a. Cured

Absence of the subjective criteria of inclusion in trial was considered in this category.

- ✶ Absence of cardinal as well as constitutional symptoms.
- ✶ Normal routine laboratory investigations including urine.
- ✶ Negative urine culture

b. Markedly improved

(i) >75% of relief in the cardinal as well as the constitutional features
(ii) Normal routine laboratory investigations including urine
(iii) Negative/Positive urine culture

c. Mildly improved

(i) 50% relief in cardinal as well as other constitutional features
(ii) Normal routine laboratory investigations including urine
(iii) Positive urine culture

d. Unchanged

(i) <25% relief in cardinal as well as other constitutional features.
(ii) Laboratory investigations remained unchanged.
(iii) Urine culture remained positive.

DISCUSSION

In the present study, to evaluate the efficacy of an *Ayurvedic* formulation in the management of *Pittaja Mutrakrichra* w.s.r. to UTI, a total 30 patients with signs and symptoms suggestive of *Mutrakrichra* were selected from OPD of PLRD Hospital of Vaidya Yagya Dutt Sharma Ayurvedic Mahavidyalaya Khurja (U.P). Out of 30 registered patients, only 27 completed the trial. Three patients could not complete the trial as they did not returned back on the scheduled time for evaluation. These 27 patients were studied in single trial group.

The patients were in the range of 16 to 50 years of age. Majority of patients were reported in the two age groups of 16-25 i.e. 37.03% & 26-35 i.e. 29.62% which was followed by 18.51% patients in the age group of 36-45 years , 14.81% patients in the age group of 46-50 years. Out of 27 patients of *Mutrakrichra*, majority of patients were females i.e. 70.37% and rest were males i.e. 29.62%. Out of 27 patients, maximum patients were unmarried i.e. 66.67% and 33.33% were married. In this study of general hygienic conditions, most of the patients i.e. 18 (66.67%) had satisfactory hygiene, followed by 9 patients (33.33%) with unsatisfactory hygiene. *Sadaha mutrata* was present in 27 patients i.e. 100%, *Saruja mutrata* was observed in 10 patients i.e. 37.03%, *Krichra mutrata* was present in 27 patients i.e. 100%, *Muhur- muhur mutrata* was observed in 27 patients i.e.100%. *Peeta/Shweta mutrata* was seen in 19 patients i.e. 70.37% and lastly *Sarakta mutrata* was present in only 8 patients i.e. 29.62%. The above data shows various constitutional features, present in 27 patients, fever was observed in 9 patients (33.33%), urgency was present in 3 patients (11.11%), hesitancy was present in 2 patients (7.40%), anorexia in 1 patient (3.70%) , constipation in 1 patient (3.70%) and retention of urine was not seen in any patient.

Microbiological studies of urine showed that the most common causative organism was Escherichia coli, which

was present in 17 patients (62.96%) followed by Staphylococci which affected almost 5 patients (18.51%) , E. coli and Staphylococci afected 4 patients (14.81%), Gram negative Cocco-bacilli affected only 1 patient (3.70%).

EFFECTS OF THE THERAPY ON CLINICAL FEATURES

***Saruja mutrata* (Painful micturition)**

The mean score of *Saruja Mutrata* was 0.70 before treatment which decreased to 0.11 after treatment. The percentage relief was 84.28 which is statistically significant. ($p < 0.05$).

***Muhur-muhur mutrata* (Increased Frequency of micturition)**

The mean score of *Muhur-muhur mutrata* was 1.59 before treatment and 0.33 after treatment showing 79.24% relief which is extremely significant statistically ($p< 0.0001$).

***Sadaha mutrata* (Burning micturition)**

The mean score of *Sadaha mutrata* was 1.52 before treatment and it is reduced to 0.30 after treatment with 80.26% relief. The result is extremely significant statistically ($p< 0.0001$).

***Krichra mutrata* (Difficulty in micturition)**

The mean score of *Krichra mutrata* was 1.63 before treatment and it came down to 0.41 after treatment with 74.85% relief. The result is extremely significant ($p< 0.0001$).

***Peeta/Shweta mutrata* (Change in colour of urine)**

The mean score of *Peeta/Shweta mutrata* was 1.11 before treatment and it is reduced to 0.22 after treatment, giving 80.18% change which is statistically extremely significant i.e. $p< 0.0001$.

***Sarakta mutrata* (Haematuria)**

The mean score of *Sarakta mutrata* was 0.52 before treatment and came down to 0.07 after treatment showing 86.53% relief which is statistically significant ($p<0.05$), as the number of patients suffering from this very particular feature were less in number.

Effects of the therapy on urine analysis findings

Pus Cells

The mean score of pus cells in urine was 1.59 before treatment and after treatment came down to 0.52 showing change of 79.25%. The result was highly significant statistically ($p< 0.001$).

RBC'S

The mean score of RBC'S in urine was 0.33 before treatment and 0.07 after treatment showing 86.53% change. The result of therapy was statistically significant ($p<0.05$).

pH

Before the trial maximum patients were having urine reaction as acidic but after the trial urine reaction of 18 patients was acidic, 3 patients was neutral and 6 patients was slightly alkaline.

Effects of the therapy on urine culture findings

The mean score of urine culture positive patients was 1.0 before treatment and after treatment it came down to 0.44 showing 56.00% change. The statistical analysis indicates significant result i.e. $p< 0.001$.

CONCLUSION

In the present clinical study **the overall effects of the therapy;** out of 27 patients, 10 patients (37.03%) were cured and became asymptomatic with respect to symptomatology and laboratory parameters. 9 patients (33.33%) were moderately improved with ≥ 75% relief in clinical features. 5 patients (18.51%) were mildly improved with 50% relief as far as symptomatology was concerned and their urine culture also remained positive after treatment in most of them. There were 3 patients (11.11%) who had <25% relief. *Pittaja Mutrakrichra* is a *Vata-pitta predominant* disease in which *apana vayu* is vitiated *and has pratiloma gati instead of anuloma.* Maximum patients i.e. 37.03% had *vata-pittaja prakriti* followed by *pitta kaphaja prakriti* (29.62%).

The results of the trial drugs were highly significant in maximum features of the disease ($p<0.001$). A better quality of urine in colour and appearance was seen in physical examination after treatment.

To conclude, it was seen that trial drug ***Vidaryadi Kwatha*** had very good efficacy in the management of *Pittaja Mutrakrichra* w.s.r. to micro-organism causing U.T.I. There were no untoward effects of the whole therapy in any patient, and was cost effective.

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