EFFECT OF SHWETHA PARPATI IN UNCOMPLICATED LOWER URINARY TRACT E.COLI INFECTION - A CASE REPORT

Ratna Prava Misra¹, Krishnakumar K²*

¹Professor and Head, Department of PhD Studies of Kayachikitsa, Mandsaur Institute of Ayurved Education and Research, Madhya Pradesh, India.
²PhD Scholar, Department of PhD studies of Kayachikitsa, Mandsaur Institute of Ayurved Education and Research, Madhya Pradesh, India.

ABSTRACT
UTI is one of the most common infections which is faced by women in this era. Even though the pathogens like bacteria, virus, fungi, protozoans etc are causing the infection, E.coli is the predominant bacteria causing UTI. If it is not treated in time it can cause organ damage. The symptoms of UTI are similar to the disease Mutrakrichra in Ayurveda. Even Though Antibiotics are helpful, the resistance of bacteria can increase and the options for treatment can decrease. It is observed that study of Swetha parpati gives good outcomes while treating the UTI caused by E-coli which is used by the Ayurveda community. A 42 year old female patient who was diagnosed as having Lower urinary tract infection caused by E-coli for the last 5 months. She was administered with the drug Shwataparpati for 14 days, by using subjective and objective assessment criteria showed the significant outcome. ICD 10 CM-N39.0 is used for selection & assessment. Fever, Chillness, urgency, Dysuria, Lower abdominal pain with bacteriuria (E.Coli), and pyuria were the signs and symptoms. After the treatment symptoms vanished and on the follow up concluded that there was no presence of E. Coli bacteria.

KEYWORDS: Ecoli, UTI, Shweta Parpati, Mutrakrichra, Lower urinary tract infection, Burning micturition.

INTRODUCTION
Urinary tract infections (UTI) are the most commonly found bacterial infections, accounting for nearly seven million office visits and one million emergency department visits, resulting in 100,000 hospitalizations of women[4]. Usually it is affected as nosocomial infections. UTI are broadly Classified into two types: Upper urinary tract infections (UUTI) and Lower urinary tract infections (LUTI). UTIs are significantly more prevalent in women than in men. This is primarily because of anatomical differences, including length of shorter urethral and moisture periurethral environment in women[2]. Sexual activity is the major cause in women (up to 90%) for bladder infection and in the initial period of marital-life it is common so it is called Honeymoon cystitis. About 80-90 percent of UTI is caused by a single type of bacteria[3]. UTI is caused by bacteria, viruses, fungi, parasites, protozoans etc. E. coli bacteria is the most common pathogen, causes 80 % of uncomplicated UTI, most studies revealed that which are done in high- or middle-income countries, other pathogens which is called secondary pathogens such as Klebsiella spp, Enterobacter, Proteus spp etc are usually found in patients with complicated UTI[4]. E.coli is an organism which is typically present in the lower intestine of humans[6], where it is the dominant facultative anaerobe present, but it is only one minor constituent of the complete intestinal microflora. Ecoli is easily grown in a laboratory setting and is readily amenable to genetic manipulation making it one of the most studied prokaryotic model organisms. These bacteria are grouped under gram negative bacteria. E. coli is also one of the most diverse microbial species, containing both pathogenic and non-pathogenic strains. Pathogenic E. coli can cause urinary tract infections and also many other complicated infections. E.coli associated with Diarrheal diseases are most common, the E.coli produce enterotoxins are called enterotoxigenic E coli[6]. Recent studies suggest 200 different types of E.coli are identified till date[7]. The infection is better managed with the Antibiotics in the existing standard of care. There are events of resistance of antibiotics against this deadly bacteria. Which shows an alarming situation with the safety of the host. The scenario imposes an immediate attention on urgent
solutions for which the scientists and researchers are giving their untiring efforts around the globe.

Urinary tract infection with this organism is more identical to the disease Mutrakrichra which is explained in Ayurvedic classics. It has similar signs and symptoms such as Fever, Chillness, urgency, Dysuria, Lower abdominal pain with bacteriuria (E.Coli), and pyuria. There are reports Ayurvedic medicines are effective against this pathogen, one similar medicine is Shwethaparpati. Svetaparpati comes under Parpati-kalpana and is also called as Ksharaparpati. It does not contain Parada(Mercury-hg) and Gandhaka (Sulphur-s8). According to Siddha yogasangraha[10], Suryakshara (Potassium-nitrate-KNO3), Sphatika (Potash-alum-Ka(5O4)2·12H2O) and Navasadar (Ammonium- chloride-NH4Cl) are the ingredients. But Bhasha samhitha added two more ingredients as Tankana and Karpoora. Svetaparpati is usually indicated in Mutra Vaha Srotodushi vikaras (diseases of channels carrying urine) Madhura (sweet) Akritchra (Diseases causing difficulty in passing urine), Mutrashmari (Diseases due to renal stones), Mutraghata (Diseases due to obstruction in passage of urine) etc[9]. According to modern science Potassium-nitrate is diuretic, Diaphoretic, antipyretic, expectorant and anti-inflammatory. Potash-alum is an inorganic salt which is safe and it was approved by food and drug administration (FDA). This drug is widely used in the homeopathic system of medicine as it has the properties of drying off secretions from tissues, antimicrobial and cosmetic effects[10]. Ammonium-chloride is one of the systemic acidifying salts reported to be helpful in maintaining pH of blood. It is known for exerting mild diuretic effect and effective expectorant in cough. This drug is having 37% solubility with water and helps the kidney to maintain the homeostatic compensatory mechanism to avoid severe metabolic alkalosis distal renal tubular acidosis and to maintain the urine at an acid pH in the treatment of some urinary-tract disorders caused by pathogens.

A pre and post test case report selected a 42 year old female patient who was diagnosed as having LUTI caused by E-coli for the last Five months. She was administered with the drug Shwetha parpati for Fourteen days, by using subjective and objective assessment criteria showed the best outcome. ICD 10 CM-N39.0 is used for selection & assessment. Fever, Chillness, urgency, Dysuria, Lower abdominal pain with bacteriuria (E.Coli), and pyuria were the signs and symptoms. The self assessment scoring method was adopted for the study. After the treatment symptoms vanished and on the follow up concluded that the E. Coli bacteria disappeared.

The pratyaatma lakshana (cardinal symptoms) of Mutrakrichra is “Dukhena mutrapravritti” (difficulty in voiding urine)[12]. According to Ayurvedic classics the 8 types of Mutrakrichra are caused by Vatajha, Pittajha, Kaphajha, Sannipathjaha, Ashmarija, Sharkaja, Shukrakja and Kshathajaha[13]. The predominant presenting feature Shoola (Pain) and Muhurmuhur-mootra pravritti (frequent voiding of urine) are due to aggravation of Vata-dosha (one among biological humor), Peeta mootrata (yellowish-urine) and Dahayukta-mutrapravritti (burning urination) are due to aggravated pitta-dosha (one among biological humor) and Picchila-mootra (turbid urine), Shwetha-mutra (whitish-urine) are due to aggravated Kapha-dosha (one among biological humor). Among all these symptoms, the most agonizing and predominant symptom is burning micturition which suggests excess Pitta-dusti and destruction of healthy tissues in the body[14].

Materials & Methods

Aim
- To Study the Effect of Shweta parpati in Uncomplicated Lower Urinary Tract E.Coli Infection

Objective
- To study the role of Shweta Parpati in the symptoms of Mutrakrichra
- To study the role of Shweta Parpati in Uncomplicated Lower Urinary Tract E.Coli Infection

2. Case information

A female patient of 42 year old with symptoms of uncomplicated lower UTI since five months approached our outpatient department. After the Primary Urine routine examination, it was found that she is suffering with bacteriuria. Further she was investigated with Urine culture and sensitivity to identify the pathogen and to find out the antibiotic resistance. The blood investigations and Ultrasonography of the abdomen was also warranted to rule out other systemic illness before the treatment. The symptoms found in the beginning Fever, Chillness, urgency, Dysuria, Lower abdominal pain with bacteriuria (E.Coli), and pyuria are present since five months. The urine culture and sensitivity report suggested severe bacteriuria with the presence of E. coli bacteria. The blood investigation revealed signs of systemic infection and the ultrasonography impression was normal without any abnormality so confirmed diagnosis as having Uncomplicated Lower urinary tract E. Coli infection.
Table 1: Showing timeline of the study

| Date          | Day of event | Label of the event              | Details of the event | Assessment and observation                                      |
|---------------|--------------|---------------------------------|----------------------|-----------------------------------------------------------------|
| 22/05/2020    | 1st day      | Screening                       | Subjective assessment AS Per ICD 10 CM-N-39.0 Present Urine Routine Examination Hematologic investigation | Presented with Fever, Chillness, urgency, Dysuria, Lower abdominal pain with bacteriuria and pyuria Colour of urine yellow Turbid urine Acidic reaction (4.9 pH) Albumin present Pus cells 20-25 cells / HPF Epithelial cells 3-4 Bacteria present ++ In hematological test ESR was 24 mm/hr |
| 25/05/2020    | 4th day      | E-coli affected Uncomplicated LUTI conformation Urine culture and sensitivity USG abdomen | | Organism isolated E-coli Colony count $10^5$ CFU/ML No resistant antibiotics Ultrasonography report showed normal study |
| 26/05/2020    | 5th day      | Medicine Dispensed              | Shweta Parpati 3gm / day in 2 and half liter of water for 14 days | - |
| 10/06/2020    | 19th day (from baseline) 15th day After drug dispensing | After treatment assessment Subjective assessment AS Per ICD 10 CM-N-39.0 Urine Routine Hematology | | All the symptoms of subjective assessment were absent In urine bacteria was nil Colour of urine clear with no turbidity and viscosity Reaction was Normal pH (6.5) Albumin- absent No pus cells Few epithelial cells observed |
| 16/06/2020    | 24th day 20th day after drug dispense | First follow up | Urine R | No clinical symptoms re appeared Was normal with no bacteriuria Colour: yellow Appearance: clear Albumin: trace Pus cell: 1-2 Ep.cell: 2-3 |
| 24/06/2020    | 31st day after base day 27th day after drug dispense | Second up follow | Urine R | No clinical symptoms re appeared Was normal with no bacteriuria Colour: yellow Appearance: clear Albumin: trace Pus cell: 1-2 Ep.cell: 2-3 |
Physical examination

At the time of testing the patient presented with pain in the inguinal region on palpation during an abdominal examination conducted. The patient was having mild temperature on touch. No eruptions or discolorations noted.

Clinical observation

The temperature reading was 101-degree Fahrenheit. The Bp was 120/80 mm of Hg, pulse rate and respiration rates were normal. On interrogation of the patient the information gathered from the patient that she used to have 9-10 times urges for urination per day, nocturia was also present 5 to 6 times.

Report on urine and blood examination

Urine examinations were performed before treatment (BT) (22/05/2020) and after treatment (AT) (10/06/2020) marked improvement in the color, reaction, albumin, pus cells, epithelial cells are observed. Initially on the first sample the bacteria was present and it was identified as E.coli (25/06/2020) which was absent on AT (10/06/2020) and follow up (FU) (16/06/2020(1st FU) & (24/06/2020 (2nd FU). The 20-25 pus cells were present in BT but it reduced to few in number during AT and on FU it showed nil. Initially Albumin was present (+) in urine but later on it became absent on AT and FU. Marked changes seen in epithelial cells, initially which were 3-4 cells /HPF, but AT and on FU it was seen as 0-1cells /HPF. The reaction was continuously acidic and pH changed from 4.9 to 6.5 range. In blood investigation found marked improvement in Hb% from 12.2 to 12.4 gm / dl and RBC count changed from 4.43 million to 4.56 million cells / UL there were difference in total WBC count also it was increased from 6400 to 5800 /cumm marked changes observed in ESR 24 mm/hr to 20 mm/hr there were significant changes in differential count also. AEC count drastically reduced from 280 to 210/cumm. The LFT and RFT remained normal.A detailed list of urine routine and Blood investigation has been provided as supplementary material in the below table.

Table 2: Showing detailed list of urine routine and Blood investigation

| Name of test | 22/05/2020(BT) | 10/06/2020(AT) | 16/06/2020(1stF) | 24/06/2020(2ndF) |
|--------------|---------------|---------------|-----------------|-----------------|
| Urine routine examination | | | | |
| Colour | Pale yellow | yellow | yellow | yellow |
| Appearance | Turbid | Slightly turbid | Clear | clear |
| Albumin | Present (+) | Absent | Absent | Absent |
| Sugar | Nil | Nil | Nil | Nil |
| Pus Cells | 20 -25 cells / Hpf | 1-2 cells /HPF | Nil | Nil |
| Epithelial cells | 3-4 cells / HPF | 0-1 cells /HPF | 0-1 | 0-1 |
| RBC | 0-1 cells/ Hpf | 0-1 cells /HPF | Nil | Nil |
| Cast | Nil | Nil | Nil | Nil |
| Crystals | Nil | Nil | Nil | Nil |
| Bacteria | Present (++) | Nil | Absent | Absent |
| Reaction | Acidic | Acidic | Acidic | Acidic |
| pH | 4.9 | 4.7 | 6.2 | 6.5 |
| Blood investigation | | | | |
| Hb% | 12.2 gm/dl | 12.4 gm/dl | - | - |
| T.WBC | 6400cumm | 5800 cumm | - | - |
| Polymorph | 55% | 58% | - | - |
| Lymphocyte | 40% | 38% | - | - |
| Eosinophils | 4% | 03% | - | - |
| Monocyte | 01% | 01% | - | - |
| Basophil | 00% | 00% | - | - |
| ESR | 24 mm/hr | 20 mm/hr | - | - |
Platelet count | 2.96 lakhs /cumm | 3.27 lakhs /cumm | - | -
RBC count | 4.43 million cells/UL | 4.56 million cells/UL | - | -
PCV | 36.6 % | 37.2 % | - | -
MCV | 81.7 Fl | 82.4 Fl | - | -
MCH | 27.5 pg | 28.6 pg | - | -
MCHC | 33.7 gm/dl | 34.1 gm/dl | - | -
AEC | 280/cumm | 210/cumm | - | -

**Diagnostic assessment**

Sterile Sample of urine for investigation was taken in a container and it is stored with utmost care. The sample was from the first mid stream of urine collected in hygienic conditions. It was sent to the laboratory for investigation. The Reports after analysis were collected and documented.

After the analysis it was understood that the culture of the urine sample was with the presence of E. coli bacteria with Colony count $10^5$ CFU/ML. Out of the 20+ antibiotics tested. All the antibiotics were found to be sensitive against the pathogen with the zone size ranges from 19-28 mm. Among them ceftriaxone/ sulbactam showed 28 mm, ceftriaxone, cefotaxime, and piperacillin/ Tazobactam showed 25 mm zone formation which are considered as the most sensitive antibiotic against this pathogen in this patient. The sensitivity pattern is enlisted in table no 3 as supplementary document.

**Table 3: Showing culture and sensitivity report**

| Antibiotic                  | Zone size | S/R/I | Sensitive mm or more | Intermediate mm | Resistant mm or less |
|-----------------------------|-----------|-------|----------------------|-----------------|---------------------|
| Cefazolin                   | 21 mm     | S     | 18                   | 15-17           | 14                  |
| Cefixime                    | 22 mm     | S     | 19                   | 16-18           | 15                  |
| Cefepime                    | 21 mm     | S     | 18                   | 15-17           | 14                  |
| Cefuroxime                  | 20 mm     | S     | 18                   | 14-17           | 14                  |
| Gentamicin                  | 19 mm     | S     | 15                   | 13-14           | 12                  |
| Piperacillin/Tazobactam     | 25 mm     | S     | 21                   | 14-22           | 13                  |
| Amikacin                    | 20 mm     | S     | 17                   | 15-16           | 14                  |
| Netillin                    | 20 mm     | S     | 15                   | 13-14           | 12                  |
| Ceftriaxone                 | 25 mm     | S     | 21                   | 14-20           | 13                  |
| Levofloxacinn               | 22 mm     | S     | 19                   | 16-18           | 15                  |
| Ampicillin                  | 20 mm     | S     | 17                   | 14-16           | 13                  |
| Cotrimoxazole               | 19 mm     | S     | 16                   | 11-15           | 10                  |
| Ceftazidime                 | 20 mm     | S     | 18                   | 15-17           | 14                  |
| Cefotaxime                  | 25 mm     | S     | 23                   | 15-22           | 14                  |
| Nitrofurantoin              | 20 mm     | S     | 17                   | 15-16           | 14                  |
| Ciprofloxacin               | 24 mm     | S     | 21                   | 16-20           | 15                  |
| Tetracycline                | 19 mm     | S     | 15                   | 12-14           | 11                  |
| Imipenem                    | 20 mm     | S     | 23                   | 20-22           | 19                  |
| Amoxicillin/ Clavulanate    | 20 mm     | S     | 18                   | 14-17           | 13                  |
| Ceftriaxone/ Sulbactam      | 28 mm     | S     | 21                   | 18-20           | 17                  |
After the diagnosis and case taking the treatment plan was charted. The drug Shweta parpati given to the patient after assessing the packet of drug is sealed. The package contained 10 gm per unit. Instructed the patient to take 3 gm of powder and mix it with two and half liters of cold water for fourteen days. The process of mixing properly demonstrated in front of the patient and advised the patient to drink this mixture 200 ml at a time in the interval of one hour for fourteen days and was advised to visit the Outpatient Department on the fifteenth day. On the fifteenth day after assessing the subjective criteria (symptoms mentioned under ICD 10 CM-N39.0) assessed objective urine and blood analysis. Advised to the patient to finish the medication and sent for the follow ups after five days and 7 days. After 2 follow ups and assessments the study was concluded with documentation.

Assessment of response

After the study, both subjective and objective assessment parameters it was found that both are shown significant treatment response. Among them the absence of bacteria from the urine was the most significant. From the clinical assessment Fever, Chillness, urgency, Dysuria, Lower abdominal pain with bacteriuria (E.Coli), and pyuria disappeared, patients general condition improved they were measured with grades using simple description scale as absent, mild, moderate and severe and appropriate scoring was given, it was found that the Study drug was effective on E-coli in this patient. and also, it is found out that this drug may be useful in patients listed antibiotics like who are sensitive to ceftriaxone /sulbactam etc drugs. There were no immediate adverse events noted/observed. The liver function and hemogram and urine analysis seen as beneficial for the patient.

DISCUSSION

The treatment selected for the patient was mainly aimed to revert the pathological process in Mutrakrichra. Mutrakrichra is termed as a Vyadi occurring due to Ama formation. During Ama condition the excess waste products which are formed from food rather than nutritive parts which nourishes the body. At the initial part of pathogenesis All the three Doshas partake to vitiate urine and cause the disease. Here the Quality of urine or the destruction and debris of the tissues of the urinary tract due to the exposure of vitiated urine may be attracting the pathogen to the urinary tract. Shwetha parpati is otherwise called Kshara parpati due to its high alkaline nature and is used in regulating Ph of blood as well as rectifying digestion impairment. As per the classics of Ayurveda it is stated that if Amla swabhava is present inside the Amashaya (Jatharagni sthana) then by the use of Kshara the rasa of food material will change to Madhura in nature which is good and healthy for the body. We have to infer that the Ph of blood and urine is changing there because Prakruthi vikhatha is happening in the urinary tract which is not favorable to these bacteria. The bacteria can be considered as Sookshma krimi which is affecting the body Moreover, Surya kshara acts as a diuretics, Sphatika has a strong antibacterial effect and Navasadara maintains acid base balance in the human body. The initial part of digestion water is formed as a result of metabolism. Water is a good solvent and an alkali is a good solute. More water helps to transport food nutrition (end product of digestion) for the purpose of metabolism. The Shweta parpati/ the qualities of Shweta parpati is excreted through the urine. Because Ayurveda says urine is having the function of removing excess water from the body. The analysis of presence of bacteria in the urine emphasise the effect of Shweta parpati in uncomplicated lower urinary tract infection. The Shweta parpati helped in Sameekarana of Doshas which were present during the pathogenesis of the Mootrakruchra. Most of the antibiotics were sensitive and they had shown good zone clearance. Even though there were no signs of hepatotoxicity and renal toxicity with normal hematological studies and it does improve anemic condition of the patient Limitations of this study is to find out the presence of any side effects. It should be done with better research potential.

CONCLUSION

The study was found to be effective in the patient with E-coli affected LUTI. Both the subjective and objective assessments showed remarkable results while using Shweta Parpati against E-coli in Uncomplicated LUTI. The limitation of this study is there are no studies regarding the long term side effects of this drug. It should be tested with proper research settings and also study with a large number of subjects is recommended for better conclusion.

REFERENCES

1. Janifer, J., Geethalakshmi, S., Satyavani, K., & Viswanathan, V. (2009). Prevalence of lower urinary tract infection in South Indian type 2 diabetic subjects. Indian journal of nephrology, 19(3), 107–111. https://doi.org/10.4103/0971-4065.57107
2. Helen, S., & Jennifer, L. (2018). PSAP 2018 BOOK 1 (pp. 7-25).
3. Vigila Christy R, Athinarayanan G, Mariselvam R, Dhasarathan P, & Ranjitsingh A J A. (2020). Epidemiology of urinary tract infection in South India. World Journal Of Biology Pharmacy And Health Sciences, 1(1), 025-032. doi: 10.30574/
Ratna prava misra, Krishnakumar K. Effect of Shwetha Parpati in Uncomplicated Lower Urinary Tract E.Coli Infection - A Case Report. International Journal of Ayurveda and Pharma Research. 2021;9(3):55-61.

Source of support: Nil, Conflict of interest: None Declared

Cite this article as:
Ratna prava misra, Krishnakumar K. Effect of Shwetha Parpati in Uncomplicated Lower Urinary Tract E.Coli Infection - A Case Report. International Journal of Ayurveda and Pharma Research. 2021;9(3):55-61.

Disclaimer: IJAPR is solely owned by Mahadev Publications - dedicated to publish quality research, while every effort has been taken to verify the accuracy of the content published in our Journal. IJAPR cannot accept any responsibility or liability for the articles content which are published. The views expressed in articles by our contributing authors are not necessarily those of IJAPR editor or editorial board members.