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Case Study

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

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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 *Shwetaparpati* 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: E.coli, 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[1]. 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[5], where it is the dominant facultative anaerobe present, but it is only one minor constituent of the complete intestinal microflora. E.coli 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 bacterias are grouped under gram negative bacterias. 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 Ayurveda 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*. *Swethaparpati* 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*[8], *Suryakshara* (Potassium-nitrate-KNO3), *Sphatika* (Potash-alum-$KAl(SO_4)_2 \cdot 12H_2O$) and *Navasadara* (Ammonium- chloride-NH4Cl) are the ingredients. But Bheshaja samhitha added two more ingredients as *Tankana* and *Karpoora*. *Swethaparpati* is usually indicated in *Mutra Vaha Srotodushti vikaras* (diseases of channels carrying urine) Madhura (sweet) *Akrichra* (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 [11] 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 *Shweta 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 mutra-pravritti*" (difficulty in voiding urine) [12]. According to Ayurveda classics the 8 types of *Mutrakrichra* are caused by *Vataja, Pittaja, Kaphaja, Sannipathaja, Ashmarija, Sharkaja, Shukraja* and *Kshathaja*[13]. The predominant presenting feature *Shoola* (Pain) and *Muhurmuhur-mootra pravrutti* (frequent voiding of urine) are due to aggravation of *Vata-dosha* (one among biological humor), *Peeta mootrata* (yellowish-urine) and *Dahayukta-mutrapravruthi* (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 *Shwetha 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 i*n 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 20-25cells /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 nill 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 afterdrug 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 nill. 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 FI	82.4 FI	-	-
MCH	27.5 pg	28.6 pg	-	-
MCHC	33.7 gm/dl	34.1gm/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 highenic 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

Bacteriology report specimen collected 23/05/2020 report generated 25/05/2020						
Nature of specimen			Urine			
Examination requested			Culture and sensitivity			
Organism isolated			E. coli			
Colony count			10^5 CFU/ML			
Antibiotic sensitivity pattern (S-Sensitive, R-Resistant, I- Intermediate)						
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
Levofloxacin	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/

wjbphs.2020.1.1.0003

4. Sandberg, T., S. Hansson, and J. Nyman, Urinvägsinfektioner, in Läkemedelsboken 2014, H. Ramström, Editor,Läkemedelsverket: Uppsala.
5. Mohammad Katouli. Population structure of gut Escherichia coli and its role in development of extra-intestinal infections. Iran J Microbiol. 2010 Jun; 2(2): 59–72.
6. Evans DJ Jr., Evans DG. Escherichia Coli in Diarrheal Disease. In: Baron S, editor. Medical Microbiology. 4th edition. Galveston (TX): University of Texas Medical Branch at Galveston; 1996. Chapter 25. Available from: https://www.ncbi.nlm.nih.gov/books/NBK7710
7. Lim, J. Y., Yoon, J., & Hovde, C. J. (2010). A brief overview of Escherichia coli O157:H7 and its plasmid O157. Journal of microbiology and biotechnology, 20(1), 5-14.
8. Vaidya Yadavjitrikamjiacharya. Sidhayoga sangraha. (1Ed.). Allahabad: Sri Vaidyanath Ayurveda bhavan limited; 1998.
9. Manju.J.U. (2020). Retrieved from http://www.rguhs.ac.in/cdc/onlinecdc/uploads/03_A023_7414.doc
10. National Center for Biotechnology Information (2020). PubChem Compound Summary for CID 24856, Aluminum potassium sulfate. Retrieved August 6, 2020 from https://pubchem.ncbi.nlm.nih.gov/compound/Aluminum-potassium-sulfate
11. National Center for Biotechnology Information (2020). PubChem Compound Summary for CID 25517, Ammonium chloride. Retrieved August 6, 2020 from https://pubchem.ncbi.nlm.nih.gov/compound/Ammonium-chloride.
12. Madhavkara, Madhava nidana, Vijayrakshita's Madhukosha Sanskrita commentary by Brahmanand Tripathi, Varanasi, Chapter 30/2, Chaukhambha Surbharti Prakashana; 2012: p.621
13. Vaidhya Jadavaji thrikamji acharya, (2016) Charakasamhita revised by Charaka and Drudabala with Ayurvedadepika commentary of Chakrapani Datta (Vimanasthana 5th Chapter Srothovimana PP 250) New Delhi -110002 (India), Chaukhamba publications, ISBN 978-93-81608-55-5.
14. Reja, A., Godatwar, P., Sharma, R., Deshmukh, P., & Singh, A. (2016). Etiopathological study of Mutrakricchra with special reference to urinary tract infection: a review. International Journal of Research in Ayurveda & Pharmacy, 7(1), 1-7. Doi: 10.7897/2277-4343.0711.

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