

Role of Ayurveda in the Management of Urinary Tract Infection

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ABSTRACT

One of the most prevalent infections with high morbidity and long-term complications is urinary tract infection (UTI). It is a serious disease that affects millions of people annually all over the world. The first line of treatment for UTI is the use of antibiotics, but the main clinical concern is the development of bacterial resistance to the drugs. People were encouraged to try alternative therapies as a result of multidrug resistance, high cost, terrible side effects, high dose, and low efficacy. Since ancient times, ayurveda has demonstrated its effectiveness in the treatment of numerous diseases. The causes, symptoms, pathophysiology, allopathic treatments, and ayurvedic methods of treating UTI are all covered in the current review article. This review will help you choose an appropriate course of treatment. This review will be beneficial to select a proper line of treatment and to develop potential herbal formulations based on the concept of our deep-rooted science Ayurveda.

I. INTRODUCTION:

Urinary Tract Infection (UTI) is the most common contagious bacterial infection frequently seen in elderly and female patients. The urinary bladder, ureter, and urethra are all susceptible to urinary tract infections (UTI). UTI is indicated by a urine culture with a bacterial count of more than 10,000 CFU/ml. An estimated 40–50% of women will have a UTI episode at some point in their lives. Every year 150 million cases are reported across the globe. However, in the USA alone approximately 7 million cases are stated annually. About 24 % of cases are reported in developing countries like India. This dreadful infection is a substantial burden for healthcare and society. In Ayurveda, UTI has been described as “Mutrakruchha”^[1].

Types of UTI:

According to the severity of infection and kind of symptoms, there are different types of UTI. It is mainly categorized as complicated, uncomplicated, and asymptomatic. In an uncomplicated UTI function of the urinary tract is normal. In complicated UTI the function becomes abnormal. The complicated infection may be isolated, unresolved infection, or reinfection type. Asymptomatic bacteriuria can be observed in healthy individuals also^[2].

Causes of UTI

The most predominant bacteria responsible for Uncomplicated and complicated UTI is Escherichia coli. The uncomplicated UTI is also caused due to Staphylococcus saprophyticus, Klebsiella, Enterococcus faecalis. The main causative pathogens of complicated UTI are Enterobacter cloacae, Serratia marcescens, Proteus mirabilis, Pseudomonas aeruginosa, Enterococcus faecalis, and Group B streptococci. Along with this variety of risk factors are involved in UTI which differ for males and females. Risk factors for males include age, obstruction/ blockage, enlarged prostate glands, diabetes, and lifestyle habits. While for women short length of urethra, pregnancy, menopause, use of catheters, high sexual activity, lower immunity, and lifestyle disorders may enhance the chances of UTI^[3].

Symptoms of UTI:

When infectious bacteria enter the urinary tract, the inner lining shows inflammation and redness. The irritation caused due to infection leads to rectal pain in men and pelvic pain in women. The most common symptoms are uncontrolled urination, burning, and pain while urinating[4,5]. Various other commonly observed symptoms are displayed in figure 10.2

Diagnosis of UTI^[4,5]:

The UTI is diagnosed based on the following tests

Urine analysis:

A urine sample is collected and tested for Various Physical analysis parameters indicating UTI.

Plain X-ray:

It is helpful to detect kidney stones that may cause infection.

Ultrasonography:

It assists in the diagnosis of incomplete emptying of the urinary bladder or urine retention. It may indicate the presence of pus cells or abscess in the prostate in case of severe infection.

Cystoscopy:

It is performed with the help of a tube attached to a camera to detect the presence of tumours, diverticulum in the urinary bladder.

Pathophysiology of UTI

UTI can be caused by three different routes such as ascending, hematogenous and lymphatic routes. In ascending route uropathogens enter the bladder through the urinary tract via the urethra. In haematogenous infection, pathogens enter through the oral route in the case of immunosuppressed patients. In very few cases pathogens enter through the lymphatic route from adjacent organs^[6].

In case of uncomplicated UTI, pathogens present in the gut contaminate the periurethral region. Such pathogens further move to the bladder and with the help of adhesion molecules and pilli colonize in superficial umbrella cells. The host immune system responds to infection causing inflammation and neutrophilic infiltration. However, due to the subversion of the immune system, some of the bacteria multiply and form biofilm. The toxin and proteases secreted by bacteria lead to host epithelial cell damage and invasion of bacteria to the kidney. The bacteria colonized in the kidney cause host tissue destruction due to toxins and if bacteria cross the tubular epithelial barrier, it can lead to bacteremia.

In case of complicated UTI, the pathogen reaches the bladder and causes infection as a result of a compromised defensive mechanism. The most common reason is the use of a catheter. In catheterization, fibrinogen inhabited on the catheter promotes pathogens attachment. Hence bacteria can easily multiply, damage epithelial cells, and lead to

bacteremia. During sexual activity, pathogens can enter the bladder from the rectum. In 80 % of cases, women become susceptible to infection due to a change in vaginal environment or loss of H₂O₂ producing Lactobacilli. UTI is commonly observed in people with low immunity as Escherichia coli entering the body cannot be cleared by the body's defense mechanism^[2].

Ayurvedic Treatment

One of the essential body parts, or "Trimarmas," according to the Ayurvedic medical system, is the bladder. In the classics of Ayurveda, the term "Mutrakrichchhra," which consists of two words, is used to describe UTI. 'Mutra' means to ooze out, and 'Krichchhra' means hurtful or troublesome. The words "mutra" and "krichchhra" are derivations of the words "Prasava" and "Kashte," respectively. Hence the pain or discomfort during micturition or UTI is described as 'Mutrakrichchhra' in Ayurveda. It can be precisely defined as a painful voiding of Urine ("dukhen mutra pravritti"). It may be an individual disease or signs and symptoms of other diseases. Ayurveda has given prime importance to UTI and related disorders mean 'Mutravaha srotas' (Urinary system) and its 'vikaras' (diseases) respectively. The products of absorption, distribution and metabolism of the body reach the urethra as an excretory product known as 'Mutra'. In 'Mutraghata' and 'Mutrakrichchhra' disorders, both the symptoms like 'Krichhrata' (dysuria) and 'Mutra-vibandhta' (Urineobstruction) can simultaneously occur but Dysuria predominantly observed in 'Mutrakrichchhra'^[8].

Etiological factors^[9]

As per Ayurveda 'Mutrakrichchhra' occurs due to vitiation of 'tridoshas' that is 'Vata, Pitta, Kapha Prakopa'. Different etiological factors that lead to 'Mutrakrichchhra' are as follows:

Aharaja Nidana (Food Related Factors): Adhyashana (overeating), Ajirna (indigestion), Ruksha anna sevana (eating of dry food), Tikshna aushadha sevana (consumption of irritating medicines), Ruksha madya sevana (excessive dry liquor consumption)

Viharaja Nidana (diet and lifestyle practices): Yana gamana (air travel), Ativyayama (excessive exercise), Aghata (Shock)

Partantra Nidana: Kaphaja arsha (Piles), Ajirna (Indigestion), Vasti vidradhi (Bladder enlargement), Gulma (tumour), Udavarta (intestinal disorders)

Types of UTI as per Ayurveda^[4,10]

Charaka describes eight types of UTI based on an imbalance of 'Tridoshas' which are as follows:

1. **Vataja:** It is caused due to Vata imbalance. It is characterized by a small quantity and frequent excretion of urine with pain at the scrotum, hypogastric, and genitals region.
2. **Pittaja:** It is caused due to Pitta imbalance. It is characterized by yellowish urine, painful and burning micturition with increased frequency.
3. **Kaphaja:** It is caused due to Kapha imbalance. The feeling of heaviness and swelling at bladder, scrotum, and penis region, slimy urine discharge are characteristic symptoms of Kaphaja UTI.
4. **Sannipataja:** It is caused due to all Tridosha imbalance so it is very difficult to treat. It is characterized by multicolour urine with a burning sensation.
5. **Raktaja:** caused due to Rakta dhatu imbalance
6. **Shukraja:** caused due to Shukra dhatu imbalance. In the case of male semen produces urine obstruction. It shows symptoms such as urine mixed with urine, pain, swelling, extreme pricking pain at bladder and testicles, stiffness while semen ejaculation is observed.
7. **Asmari:** It is caused due to kidney stones
8. **Sharkaraja:** It is caused due to an increase in sugar.

Symptoms

The common symptoms of UTI described in Ayurveda are pain, hesitancy, increased urination frequency, the passage of a small amount of urine, and fever. The symptoms are described by following Shloka in Ayurvedic texts^[8].

AYURVEDIC MANAGEMENT OF UTI

UTI is managed through diet and lifestyle changes, the use of herbal mineral medicines, yoga, meditation, and body cleansing, or Panchakarma, as described in Ayurvedic texts. In other words, Shaman (Pacification), Shodhana (detoxification), and Bahirparimarjan Chikitsa (externally used medicines) are the foundations of Ayurvedic management. Mutra-vishodhaniya (urethritis), mutra-virechaniya (cleansing), mutra-viranjaniya (bleaching), and ashmarihara are all part of the shaman chikitsa.

(urolithiasis) dravyas. Shodhana chikitsa uses diuretics and Uttara vasti to eliminate toxins from the body. Different forms of medicines such as douches, fomentation, showers, poultices, and ointment are externally applied to treat UTI in Bahirparimarjan Chikitsa^[8,9].

Panchakarma Treatment for UTI^[4]

Panchakarma is a cleansing and rejuvenating treatment for body, mind, and consciousness. It helps to maintain overall muscle tone, pH, and neurological control of the urinary bladder. It includes the following therapies.

Snehana (Oleation Therapy): It includes Oral administration of medicated ghee to transport bioactive to the urinary bladder. It assists in achieving tone and neurological control of the bladder. Along with this oil, the application is carried out at the waist, flanks, stomach, and groin areas to regulate Vata dosha.

Swedana (steam therapy): In this process, sweat is induced from steam generated from medicated decoction. Due to sweat toxins get liquified and proceed towards the alimentary canal for elimination. It reduces stiffness and heaviness in the body. E.g., Avagaha sweda, Tapa sweda

Vamana (Therapeutic vomiting): Emesis is induced with the help of herbal medicines in the case of Kapha predominance to remove toxins. It should be cautiously done under the supervision of doctors.

Virechana(Purgation): Herbal purgatives are used to eliminate blockage of pathways of Vata humor. It helps to alleviate Pitta's predominant symptoms.

Vasti (enemas): Medicated enemas in the form of herbal extracts, oils, paste with rock salt or honey are used to cleans various channels in the body. It specially cleans the large intestine and rectum. This therapy assists in the treatment of dysuria and obstruction. It helps to calm down Vata humor and remove its blockage. It assists in pH, muscle tone maintenance, neurological control of the bladder. E.g. Anuvasana vasti, Nirooha vasti.

Uttara vasti (UTI enemas): It is a special type of vasti for UTI. These herbal medications are introduced through the urethral route. It is useful to treat chronic UTI.

Body treatments^[11]: Ayurveda is based on Tridosha or three energies mainly Vata, Pitta and

Kapha in the body. As UTI originates from an imbalance of these Tridoshas, the body treatments aim to balance these doshas. Specific types of body therapies are implemented for the management of different types of UTI and to strengthen the urinary tract. To balance Vata Dosha oil treatment and heat treatments are

treatment and heat treatments are preferred. To alleviate Pitta Dosha cool baths, cooling oils or cooling pastes are preferred. Kapha Dosha is balanced using oral administration of bitter tasting herbs. The body treatments are as follows:

For Pitaja mutrakrechra:

- **Oil Massage:** whole-body massage is given using cooling oils such as coconut oil, sunflower oil, and olive oil.
- **Local massage:** Massage with cooling paste on pelvis area.
- **Bath:** To pacify pitta cold bath is given with herbs like Amla, Gokharu, Manjishta
- **Enema:** Medicate Niruha basti, Medicate Anuvasanabasti
- **Special treatment:** Virechana and Uttara Basti

For Kaphaja mutrakrechra:

- **Oil Massage:** Oil massage is given with oil prepared with bitter herbs.
- **Enema:** Niruha basti is given.
- **Special treatment:** It includes fomentation, Vamana therapy, and Uttara Basti.

Ayurvedic formulations ^[14,15]

- **Chandraprabha Vati:** It is a Herbo mineral combination of 42 ingredients mainly comprising of Trikatu, Shatavari, Marich, Triphala, rock salt and guggul, etc. It has anti-inflammatory properties. It is used in the treatment of dysuria, haematuria, infection, painful micturition, renal calculi, pain and to remove toxins. It can be administered with milk, honey, brihatyadi kwath.
- **Shweta parpati:** Shwetparpati is a combination of potassium nitrate, Alum, and Ammonium chloride. It is digestive in action. It is used to treat mandagni, ajeerna, udarshool, and UTI. It acts as a diuretic and antibacterial agent.
- **Pravala Bhasma:** It is a bhasma formulation prepared from red corals. It is used in the treatment of tachycardia, palpitation, dysuria, and respiratory tract disorders. It is taken with honey, milk, ghrita, or rice washings.

- **Gokshuradi Guggulu:** It is a combination of Gokshura, shuddha Guggulu along with seven medicinal herbs. It is available in powder or tablet form. It helps to get rid of kidney stones, urine acidosis, infection dysuria, and painful urination.
- **Renalka Syrup:** It is effective in curing burning sensation, cystitis, urethritis, urine retention, pain, inflammation of the bladder, maintains normal urine pH, and increases renal blood flow. It is composed of Asparagus, Indian Sarsaparilla, small Caltrops, and nutgrass.
- **Eladi Churna:** It consists of cinnamon, cardamom, pippali, nagkeshar, marich, shunti, and sugar. It is used to treat UTI, vomiting, throat infection, anorexia, and chest pain.
- **Amrutadi Kwath:** It is a decoction prepared from ashwagandha, Shunthi, Guduchi, Amalaki, and Gokshura, etc. It helps to get rid of urine obstruction and kidney stones.
- **Trinapanchamula kwatha:** It is a decoction of five types of grasses mainly Kush, Kash, Shara, Darbha, and
- **Chandanasava:** It is recommended for the treatment of burning micturition, cystitis, urethritis, gonorrhoea, and digestive disorders. It is polyherbal asava preparation comprises sandalwood, Hrivela, Nagarmotha, Jesthimadh, Gambhari, Kalmegh, etc.
- **Shatavari Ghrita:** It is prepared from Shatavari churna, milk, Shatavari kwath, and ghrita. It is recommended for the treatment of hyperacidity and UTI.
- **Mutrala Kwatha:** It is ayurvedic proprietary medicine used in renal care. It is antiseptic and diuretic. It aids to treat urine retention, inflammation, cystitis, etc.
- **Alka-5 Syrup:** It is a polyherbal Ayurvedic proprietary medicine made up of Yavakshara, Shwetparpati, coriander, Cumin, and Gokshura. It is a diuretic, antibacterial, and alkalizer. It reduces irritation, urgency, and frequency of urine. It is useful in curing cystitis, urethritis, dysuria.
- **Punarnavadi Guggulu:** It is a combination of Punarnava, Devdaru, Ikshu. It acts as an antipyretic and anti-inflammatory agent. It cures burning micturition, pus, and epithelial cells in urine.
- **Punarnavasava:** It is polyherbal preparation made up of South, Pippali, Triphala, Daruhaldi, Kali mirch, Kutki, Neem, and various other herbs. It is an effective

antibacterial, anti-inflammatory, and antipyretic medicine.

Dietary and lifestyle Management ^[11]

- The change in dietary habits and lifestyle management are an integral part of Ayurvedic treatment. Patients Limit the intake of caffeine-containing drinks and alcohol.
- Proper cleaning of genital organs after defecation.
- The use of probiotics and vitamin C supplements can avoid UTI.
- Pranayama such as Bastrika, Mool Bandh, Nadishodhan is helpful to avoid UTI.
- Yoga practice of Surya namaskara, Utkatasana, Setubandha Sarvangasana, Malasana and Savasana can avoid UTI.
- A stress-free lifestyle should be adopted.

II. CONCLUSION:

Urinary tract infections (UTI) pose a noteworthy challenge to the healthcare system due to multidrug-resistant uropathogens. Ayurvedic system of medicines has proved its effectiveness since the historic era as it is based on the elimination of the root cause of disease. Ayurvedic treatment not only involves the use of medicinal plants, formulations but also includes cleansing and rejuvenating treatment like Panchakarma, regulation of Tridoshas, dietary and lifestyle management, yoga, and meditation. Although it is difficult to manage, Ayurveda could be a good option to manage UTI.

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