

Urinary tract infection (UTI): Western and Ayurvedic Diagnosis and Treatment Approaches. By: Mahsa Ranjbarian

Urinary system

Renal or Urinary system is one of the 10 body systems that we have. This system is the body drainage system. The urinary system is composed of kidneys (vrikka), ureters (mutravaha nadis), bladder(mutrashaya) and urethra(mutramarga).

The kidneys are a pair of bean-shaped, fist size organs that lie in the middle of the back, just below the rib cage, one on each side of the spine. Ureters are tubes that carry the wastes or urine from the kidneys to the bladder. The urine finally exit the body from the urethra when the bladder is full.¹ Urethras length is shorter in women than men due to the anatomical differences.

Major function of the urinary system is to remove wastes and water from our body through urination. Other important functions of the urinary system are as follows.

1. Prevent dehydration and at the same time prevent the buildup of extra fluid in the body
2. Cleans the blood of metabolic wastes
3. Removing toxins from the body
4. Maintaining the homeostasis of many factors including blood PH and blood pressure
5. Producing erythrocytes
6. make hormones that help regulate blood pressure
7. keep bones strong
8. keep levels of electrolytes, such as potassium and phosphate, stable²

The Urinary system like any other systems of our body is working under the forces of three doshas, subdoshas. Mutravaha srotas, Ambuvahasrota and raktavahasrota are involved in formation and elimination of the urine. Urine gets separated from the rasa by maladhara kala with the help of pachaka pitta and samana vayu and then through the mutravaha srota(channels carrying the urine) it is taken to the bladder. Basti(mutrashaya) is seat of urine and is described as one of the three vital parts of our body in Ayurvedic classical texts. Thus, keeping the basti healthy and treating its diseases are essential for our general health. Caraka samhita counts thirteen urinary diseases. Scholars and other recent textbooks disgust these thirteen types under the four folowing major categories, Mutrakrcchra (dysuria), Mutraghata (Urinary retention syndromes), Prameha (polyuria, diabetes mellitus) and Ashmari (urinary calculus).^{3,4}

Urinary tract infection (UTI)

Urinary tract infection may be defined as the presence of pathogens (microorganisms) in any part of the urinary system which leads to an infection.⁵The further up in the urinary system the infection is located, the

more serious it is and it can result in minor or major illness. UTI generally characterized by dysuria, frequent and painful urination which brings discomfort and decrease the quality of life.^{6,7}

Table 1-1 is showing common definition of UTI through the urine examination.

Table 1-1, common definition of UTI⁸	
Bacteriuria	Presence of Bacteria in urine, as demonstrated by microscopy or quantitative culture
Pyuria	Presence of white blood cells or pus in the urine ≥10 ⁴ white blood cells per milliliter of urine
Hematuria	Presence of blood in the urine, either visible to the naked eye (macroscopic) or invisible to the naked eye (microscopic)
Significant bacteriuria	≥10 ⁴ colony-forming units/ml of bacteria (usually of a single species) in a fresh urine specimen
Symptomatic bacteriuria	Presence of bacteria in urine in the context of typical symptoms of UTI
Asymptomatic bacteriuria	Presence of bacteria in urine in the absence of symptoms of UTI on at least two consecutive occasions
Urosepsis	UTI with accompanying sepsis syndrome

Mutrakrcchram and Mutraghata are to broad headings defining urinary tract diseases in Ayurveda classical text books. Although the symptom complex of both headings seems to be overlapping but some Acharyas has differentiate them based on the intensity of obstruction. “The earlier suggest that the disease is characterized with painful micturation whereas the latter with more of obstruction.”⁹

Urinary tract infection described under the broad term of Mutrakcchra. The term is comprised of two words- mutra and krichra. Mutra means ooze, krichra means painful. Thus, dysuria and painful urination called as Mutrakcchra. Due to most of the Ayurvedic classical texts any type of discomfort during urination and specially lower track infection problems are included under Mutrakrcchra.¹⁰ “Mutrakrcchra can occure as an independent disease as well as purvarupa and rupa.”¹¹

Epidemiology

UTI is a noncontiguous condition. “It has been estimated that symptomatic UTIs result in as many as 7 million visits to outpatient clinics, 1 million visits to emergency departments, and 100,000 hospitalizations annually. UTIs have become the most common hospital acquired infection, accounting for as many as 35% of nosocomial infections, and they are the second most common cause of bacteremia in hospitalized patients.”¹²

Infants, young women, the elderly and hospitalized patients are more at risk of UTIs. Among these groups, adult women are most commonly affected as their urethra is shorter than men and opens nearer to the anus which makes it easier for bacteria to enter the urinary system and cause an infection. UTIs are more common in sexually active women, women who use spermicide-based contraception, women with history of previous UTIs, pregnant women and after menopause.^{13, 14}

Etiology, Pathogenesis and pathology

Although the urinary tract is normally a sterile environment, pathogen agents can migrate to the urethra from the rectum or vagina. When bacteria, microbes, viruses, fungi and parasites get in to the Urinary track and under any conditions find the chance to multiply in the urine, they can lead to UTIs. Majority of the invasions of the urinary system and UTIs are caused by bacteria and of them the most common bacterial species are among the enteric bacteria's. Escherichia Coli in particular (E. coli) has the headship (80 percent) of the most frequent causes of the UTIs.^{15, 16}

“There are two major routes by which microbial pathogens can infect the urinary tract: ascending spread of fecal flora and hematogenous spread. The most common route of infection is migration of organisms from the perineum through the urethra to the bladder and then to the kidney. Around 95 % of UTIs are thought to arise in this way.”¹⁷

Structural and functional abnormalities, metabolic disorders, impaired immunity system, catheters or tubes placed in urethra and bladder are other root causes which increase the chance of UTIs. Diabetes, enlarged prostate, Urinary retention, Bowel incontinence, kidney stones, staying still and pregnancy are conditions that categorized among this group and prevalence the UTIs.^{18, 19}

Most of the generally common etiological agents of UTIs are listed in the table below.

Pathogens	Bacteria species	Escherichia coli
		Coagulase-negative staphylococci
	Klebsiella species	
	Proteus species	
	Enterobacter species	
	Morganella morganii	
	Citrobacter species	
	Pseudomonas species	
	Neisseria gonorrhoea (sexually transmitted)	
	Chlamydia trachomatis (sexually transmitted)	
	Enterococcus species	
	Staphylococcus aureus	
	Staphylococcus saprophyticus	
	Candida albicans	
	Candida glabrata	
	Candida tropicalis	
	Candida parapsilosis	
	Candida krusei	
	BK virus	
	adenovirus	
	cytomegalovirus	

Etiologies (Nidana) of Mutrakrcchra can be divided in two groups. Samanya nidana (General etiology) and Vishishta nidana (Specific etiology). Samanya nidana of Mutrakrcchra can be ones that generally can vitiate

mutra vaha srota. They can be due to foods, drinks, sexual activities and urinary urge suppression. In Caraka Samhita Vishishta nidanas of Mutrakrcchra are described as follows.²³

- Excess exercise considering one’s own capacity
- Taking food, medicament and other substances with sharp and dry quality
- Habitual intake of alcohol
- Riding over the back of the fast moving animals regularly
- Intake of the meat of animals inhabiting marshy lands
- Intake of fish in excess
- Intake of food before the previous meal is digested
- Chronic indigestion

Ayurvedic concept of pathogenesis lies in understanding the doshas and subdoshas in the manifestation of diseases. Causative factors like excessive intake of cold food and drinks, dry substances and food that lack oil, not enough nutrient, fear based emotions and grief leads to vitiate vata dosha specially apana vayu. Excessive intake of alcoholic drinks, fish, pungent, sour, salty tastes plus lots of desires and second chakra emotional malfunctioning causes aggravation of pitta dosha, especially pachaka pitta. Intake of cold and heavy foods, mucous forming foods, marshy places animal meat, sedentary lifestyle, food indigestion aggravates kapha dosha which in turn leads to reduced state of Agni. Hence all the tridoshas get vitiated.

The vitiated tridoshas along with the state of agnimandhya (Manda Agni) invariably produce Ama. Ama mixes with the doshas forming samadoshas. These samadosha produces symptoms such as peetamutrata (yellowish urine), sadahamutra pravrutti (burning micturition), basti and mutrendriya gurutwa (inflammation of bladder), shweta, snigda and picchila mutra (turbid urine with the presence of leucocytes).^{24, 25}

Samprapti(pathology) of Mutrakrcchram(Lower UTIs) are described in table 1-3 as follows.

Table 1-3: Samprapti of Mutrakrcchram(Lower UTIs)²⁶				
evidence	dosha	subdosh	dhatu	srota
Dryness in the urinary system with infection	Vata	Vyana	Rasa	Mutravaha
Increased frequency, urgency	Vata	Apana	N/A	Mutravaha
Burning urination and infection	Pitta	Ranjaka	Rasa	Mutravaha
Blood in urine	Pitta	Ranjaka	Rakta	Mutravaha
Mucous in the urine, heaviness in the pelvic region	Kapha	N/A	Rasa	Mutravaha
Increased frequency, urgency	Kapha	N/A	N/A	Mutravaha

Classification

Urinary tract infection classifies due to the anatomical location of the infection and the terms of severity and complexity of the condition. Table 1-3 gives more details about UTI classification.

Anatomical location	Lower UTI	Urethritis	Infection of the Urethritis	
		Cystitis	Infection of the bladder	
	Upper UTI	Pyelonephritis	Infection of kidneys	
Severity and complexity	Uncomplicated UTI	Are generally defined as lower tract infections affecting women with no structural, metabolic, or immunological predispositions. Some authorities also group cases of pyelonephritis with no complications in this category		
	Complicated UTI	Are those that involve the upper urinary tract and/or occur in individuals with predisposing factors such as structural and functional abnormalities, metabolic disorders, or impaired immunity		
	Recurrent UTIs	Relapses	Symptoms recur on cessation of treatment and the same organism is isolated	
		Re-infection	A new causative organism is isolated	

Mutrakrcchra is of eight types. The first four types are due to the vitiation of doshas individually and jointly. The other four types are the result of health conditions which have their own vitiated dosha root causes and etiology.

1. Vataja mutrakrcchra: caused by aggravated vata
2. Pitaja mutrakrcchra: caused by aggravated pitta
3. Kaphaja mutrakrcchra: caused by aggravated kapha
4. Sannipatika mutrakrcchra: caused by aggravation of all three doshas
5. Asmari mutrakrcchra: caused by calculus in the urinary tract
6. Sarkaraja mutrakrcchra: caused by graveluria
7. Sukraja mutrakrcchra: caused by affliction and obstruction of semen
8. Sonitaja mutrakrcchra: caused by vitiated blood as a result of trauma²⁹

Symptoms of UTIs

Symptoms of lower urinary tract infection

- Inflamed and irritated lining of the urethra and
- Suprapubic pain: Lower abdominal pain or pelvic pressure
- Dysuria: pain or burning during urination
- Frequency micturition: more frequent urination; often with only a small amount of urine
- Urinary urgency: the sensation of having to urinate urgently
- Hesitancy and incomplete voiding
- Cloudy, bad-smelling, or bloody urine

Symptoms of upper urinary tract infection (Pyelonephritis)

- renal angle tenderness
- Fairly high fever (higher than 101 F)
- Shaking chills

- Nausea
- Vomiting
- Flank pain: pain in the back or side, usually on only one side at about waist level
- All the lower UTIs symptoms may or may not be present

Classic symptoms may not be present in newborns, infants, children, and elderly people. Other symptoms which are listed may indicate a urinary tract infection among these groups.

- Newborns: fever or hypothermia (low temperature), poor feeding, jaundice
- Infants: vomiting, diarrhea, fever, poor feeding, not thriving
- Children: irritability, eating poorly, unexplained fever that doesn't go away, loss of bowel control, loose bowels, change in urination pattern
- Elderly people: fever or hypothermia, poor appetite, lethargy, change in mental status^{30,31}

Symptoms of different types of Mutrakrcchra: ^{32, 33}

- Excruciating pain in groin, bladder and genitals
- pain and or burning sensation when urinating
- urine passes frequently with difficulty
- urine is associated with slimy material
- yellowish urine
- blood in urine
- urine is associated with slimy material
- low quantity of urine
- urine obstruction
- heaviness and edema in bladder and phallus

Risk Factors

Everyone has some risk to develop Urinary tract infections but following factors increase the incidence of UTIs. ^{34, 35}

- Structural and functional abnormalities: include congenital abnormalities, cysts and diverticula, enlarge prostate, neurological defects causing urinary retention.
- Blockage: kidney or bladder stones
- Not being circumcised: the foreskin of the penis makes it easier for germs to get trapped and enter the urinary tract
- Foreign bodies: catheter or tube inside urethra or bladder

- Metabolic abnormalities: Glycosuria in diabetes mellitus and pregnancy encourages the growth of bacteria
- Impaired immunity: using immunosuppressive drugs increase the possibility of growth of bacteria
- Infrequent and incomplete voiding
- Personal hygiene: Either poor hygiene or excess cleaning of the feminine hygiene deodorants and scented toilet paper
- Sexual Activity: Trauma to the urethra and surrounding, the bacteria can be mechanically pushed into the urethra, infected sexual partner, anal sex
- Mode of birth control: spermicidal contraception, spermicidal condoms, diaphragm
- Genetics: Certain cells on the vaginal mucosa and the urethra can express receptors that actually allow certain bacteria to attach and pull themselves into the bladder causing an increase risk of a UTI.
- Hormonal Status: menopause, (lack of estrogen allows for thinning and deficiency of the tissue in the vagina and urethral that may allow for greater susceptibility to UTIs)

From Ayurvedic perspective, risk factors of UTI are the same as the etiology and pathogenesis factors of the Mutrakrcchra.

Diagnosis

When two or more symptoms of lower UTI and Upper UTI are present in a person the health care provider will usually test a sample of urine for the presence of bacteria and white blood cells, which are produced by the body to fight infection. There are lots of methods to diagnosis of different type of infection in the body but UTI are still generally diagnosed as they have been for decades which are by urine culture. For urine culture urine sample will be collected and send to lab to be analyzed through urine culture. The best sample is a “clean catch” midstream sample of urine placed in the sterile cup. In order to have a “clean catch” sample the patient (women and not being circumcised men) should wash the genital area properly before collecting their urine. This will help to avoid getting the transient organism that may be found on the surface of the genital in to the urine sample. The urine culture test results will take approximately 3 days to be ready^{36, 37}. Using the best medication to treat the infection, some health care provider will send the sample for sensitivity test as well to test the bacteria for sensitivity to different antibiotics.

With the recurrent UTIs additional tests and examination will be demonstrated to see if the person’s urinary tract is normal. These tests may include Kidney and bladder ultrasound, Voiding cystourethrogram, (CT) scan, MRI, Radionuclide scan, Urodynamics and Cystoscopy.³⁸

Ayurvedic diagnosis of the condition is through signs and symptoms of the disease. Different diagnosis of Mutrakricchra from other Urinary tract complications is more explained in table 1-4. Lab results are very important to clarify the treatment dimensions, daily habitual changes and choosing the right medicine.

Table 1-5: differential Diagnosis of Mutrakricchra with Mutraghata, Ashmari and Prameha³⁹

	Features	Mutrakricchra	Mutraghata	Ashmari	Prameha
1	Presentation of Urination	Urination with burning sensation and pain	Burning sensation and pain	Mutadhara sanga and vishrinadhara	No burning sensation
2	Nature of Urination	White, yellow or red color urine	Anuria	Hematuria	Depends upon urine
3	Prominent feature	Difficulty in urination is more prominent	Obstruction is more prominent	Mutadhara sanga and vishrinadhara	No obstruction

Analysis of etiology and symptoms of Mutrakricchra discloses the fact that pitta and vatta vitiations factors and vata and pitta vitiations play a significant role in manifestation of Mutrakricchra.

Treatment

UTIs are among the most common of bacterial infections and are frequent causes of morbidity and mortality. They are the second most common reason for the prescription of empirical antibiotics and are also major drivers of antibiotic usage and antibiotic resistance.⁴⁰

Thus, the main element of treatment will be antimicrobial drugs specially antibiotics. Even in the UTI cases that the root cause is due to structural problem or any other non bacterial problems the antibiotic treatment will be demonstrated and then the root cause will be detected and treated. Some analgesics and smooth muscle relaxer drugs may be use to reduce pain.

The choice of medication and length of treatment depend on the patient's underlying medical condition, pathogens that are causing the infection and susceptibility of the pathogens to treatment.

Patients with severe Upper UTI symptoms who are very ill usually require intravenous (IV) antibiotics and admission to a hospital. Patients with milder UTIs symptoms (cystitis) will be treated with oral antibiotics. Some patients may have a UTI caused by pathogens that cause STDs (sexually transmitted disease) which may require more than a single oral antibiotic.⁴¹

To prevent the infection traveling to higher parts of the urinary tract the treatment usually begins before the pathogenic agent and its antibiotic susceptibilities are known. Thus, after caregivers receive the urine culture results they may change the antibiotics in some individuals. It is also important to know that pediatric patients and pregnant patients should not use certain antibiotics that are commonly used in adults.

The length of treatment (taking antibiotics) varies from 3 days to 14 days and even six month depending how acute and recurrent the condition is.^{42, 43}

According to a research in American journal of clinical medicine," an evidence-based guideline for the anti-microbial treatment of UTI in adults was published in March 2011 by the Infectious Diseases Society of

America and the European Society for Microbiology and Infectious Diseases and included interesting considerations, balancing the positives of likely efficacy with negatives, termed “collateral damage,” relating to the “ecological adverse effects of antimicrobial therapy.” The following recommendations come from that guideline.”⁴⁴

Table 1-6: Antibiotic treatment for uncomplicated acute Cystitis ⁴⁵
Nitrofurantoin 100 mg BID for 5 days OR Trimethoprim-sulfamethoxazole DS (160/800 mg) BID for 3 days (if prevalence of resistance is < 20%) OR Fosfomycin trometamol 3 gm single dose OR Pivmecillinam 400 mg BID for 5 days (not available in the United States)
<i>If availability or allergy history precludes these choices, then use:</i> Fluoroquinolones for 3 days OR Beta-lactams (amoxicillin-clavulanate, cefdinir, cefaclor, or cefpodoxime-proxetil) for 3 to 7 days Abbreviations: BID, twice a day; DS, double strength

Table 1-7: Outpatient Antibiotic Treatment for Uncomplicated Acute Pyelonephritis ⁴⁶
<i>If fluoroquinolone resistance prevalence is less than 10%</i> Ciprofloxacin 500 mg BID for 7 days, with or without an initial 400-mg dose of IV ciprofloxacin or 1 g of IV ceftriaxone or a consolidated 24-hour IV dose of an aminoglycoside OR Ciprofloxacin XR 1000 mg once daily for 7 days OR Levofloxacin 750 mg once daily for 5 days <i>If fluoroquinolone resistance prevalence is 10% or more, then use:</i> Ciprofloxacin 500 mg BID for 7 days, plus initial 1 g dose of IV ceftriaxone or a consolidated 24-hour IV dose of an aminoglycoside OR Ciprofloxacin XR 1000 mg once daily for 7 days, plus initial 1 g dose of IV ceftriaxone or a consolidated 24- hour IV dose of an aminoglycoside OR Levofloxacin 750 mg once daily for 5 days, plus initial 1 g dose of IV ceftriaxone or a consolidated 24-hour IV dose of an aminoglycoside <i>If</i>

Side effect of using UTI treatment antibiotics in some patients are diarrhea, nausea, vomiting, headaches, dizziness, convulsion, hallucination, photosensitivity, blood disorders, hepatitis, allergic reactions such as rashes and erythema, vestibular and hearing damage.⁴⁷

Some alternative medicine studies show that using cranberry fresh juice not only improves some of the symptoms of the UTIs but it has some preventing effects especially in women. Also, Using Vitamin C in pregnant women, Vitamin A in children and adults can be beneficial in regard of prevention of UTIs. Moreover, taking Probiotics products or tablets every day decreases the E.coli colonization in stool.^{48, 49}

Table 1-6 contain some alternative treatments and prevention methods.

Diet and Nutrition	<ul style="list-style-type: none"> • Drink plenty of fluids (2 to 4 quarts each day). Patients with kidney failure should consult with the health care provider to learn how much fluid is healthy for them. • Drink cranberry juice or use cranberry tablets, but take consideration if you have a personal or family history of kidney stones. • Avoid alcohol and caffeine drinks • keep the blood sugar under control If you are diabetes
Personal hygiene	<ul style="list-style-type: none"> • Use sanitary pads instead of tampons and change the pad each time you use the bathroom. • Do not douche or use feminine hygiene sprays or powders and do not use any product containing perfumes in the genital area. • Use estrogen cream in the vagina area after menopause • Take showers instead of baths • Keep your genital area clean • Wipe from front to back after using the bathroom. • Avoid anal sex • Lubricate adequately during sexual intercourse
Clothing	<ul style="list-style-type: none"> • Avoid tight-fitting underwear and pants • Use cotton-cloth underwear and pantyhose, and change both at least once a day.
Urination habits	<ul style="list-style-type: none"> • Urine when the urge arise • Empty your bladder completely • Urinate before and after sexual activity and clean your genital and anal areas before and after sexual activity
Birth control	<ul style="list-style-type: none"> • spermicidal contraception • Avoid diaphragm • Avoid spermicidal condoms • Avoid unlubricated condoms

Ayurvedic Treatments of the Mutrakrcchram(Lower UTIs) acts through different aspects. Using herbs, Body therapies, Sensory therapies, Changing diet, Changing life style and apply yoga and meditation are the tools that Ayurveda benefits from to cure this condition naturally.

Herbs

Useful and effective herbs for treating UTIs disorders with their action on doshas are listed in table below.

Herbs	Category	Applications in treating UTI	Action on Doshas
Barberry	Diaphoretic, Expectorant, Astringent, Emetic	It kills microorganisms (<i>E. coli</i> , <i>staphylococci</i>) that cause urinary tract infections	KV- , P+
Buchu	Diuretic, Diaphoretic, Stimulant	Urinary antiseptic, diuretic, urinary disinfectant. Its volatile oil stimulates urination and is excreted virtually unchanged by the kidneys, rendering the urine slightly antiseptic.	PK- , V+
Burdock	Diaphoretic, Expectorant, Astringent,	Contains chemicals (polyacetylenes) that kill disease causing bacteria and fungi. It has been used traditionally for urinary tract infections	PK- , V+
Chamomile flowers	Diaphoretic, Carminative, Nervine	Chamomile flowers reduce muscle spasms and pains, reduce inflammation and are antiseptic. These compounds have a sedative and relaxing effect	PK- , Vo

Cinnamon	Stimulant, Diaphoretic, Alternative	Suppresses completely' the cause of most urinary tract infections (<i>E. coli</i>) and the fungus (<i>Candida albicans</i>) responsible for vaginal yeast infections	VK- , P+
Cleavers	Diuretic, Stimulant Alternative	Soothing diuretic which is useful for acute or chronic cystitis with swollen lymph nodes and uterine inflammation.	PK- , V+
Coriander	Alternative, Diaphoretic, Diuretic, carminative	It is very effective in burning urethra, cystitis and most of the urinary tract infection conditions	VPK =
Couch grass.	Diuretic, Anti- inflammatory	Diuretic with a soothing, anti-inflammatory healing effect on the lining of the bladder. Useful when there is mucus discharge from the bladder with painful and frequent urination	PK- , V+
Corn silk	Diuretic, Demulcent Alternative	Soothing, Anti-inflammatory Diuretic that directly reduces painful symptoms and swelling due to inflammation.	PK- , V+
Dandelion root	Diuretic, Alternative, Laxative	It increases the flow of urine and has a laxative effect. Herbal diuretics help to cleanse the system. By promoting the release of fluids from the tissues it helps to relieve the false sensations of urgency characteristic of cystitis.	PK- , V+
Gokshura	Diuretic, Aphrodisiac, Nervine	It helps and soothes difficult urination, reduce edema, helps in kidney and bladder stone, helps in chronic cystitis	VPK =
Goldenseal	Bitter tonic, Antipyretic, antibiotic	Good for bladder infections if there is bleeding. It is an effective antimicrobial and choleric.	PK- , V+
Guggul	Antispasmodic, Antiseptic, Stimulant	It helps in cystitis, diabetes	KV- , P+
Hydrangea		Good for stimulating the kidneys and flushing them clean	
Juniper berry	Diuretic, Diaphoretic, Carminative, analgesic	Juniper relieves pain and is antiseptic, diuretic, and stimulant	KV- , P+
Manjishta	Diuretic, Hemostatic Alterative	It helps in kidney and bladder stones and in the cases that bleeding is there	PK- , V+
Marshmallow root	Tonic, Demulcent, Diuretic, Laxative	Increases the acidity of the urine thus inhibiting bacterial growth. It helps to strengthen and cleanse the bladder. Marshmallow is the best source of easily digested vegetable mucilage which lubricates the body, protecting it against irritation and dryness. It soothes the urinary system and is usually combined with other diuretic herbs to treat kidney and bladder inflammations, difficult or painful urination and kidney stones or gravel. It stops bleeding in the urine.	PV- , K +
Parsley	Diuretic, Emmenagogue, carminative	It is good for swollen glands, kidney stone, it should take under caution if there is acute kidney inflammation	KV- , P+
Plantain	Astringent, Alternative, Diuretic, vulnerary	It has cooling diuretic properties that make it beneficial for kidney and urinary bladder infections.	PK- , V+
Shilajit	Diuretic Lithotriptic, Antiseptic	It is very good for dysuria, cystitis and kidney stone	KV- , P+
Shepherd's	Astringent,	Bleeding	PK- , V+

Purse	Haemostatic, alterative		
Uva ursi	Diuretic, Astringent, Antiseptic	For irritable bladder or an atonic boggy bladder, bacterial vaginosis and ulcerative cystitis Uva ursi is a strong, non-irritating diuretic and urinary antiseptic for bladder and kidney infections. When combined with marshmallow it helps to eliminate stones from the kidney and bladder. It strengthens and tones the urinary passages and is effective to treat blood in the urine.	
Yarrow	Diaphoretic, Astringent, Alternative	Anti-inflammatory, Antipyretic, Spasmolytic, Diaphoretic, Astringent, tonic. It regulates many urination problems and soothes and heals mucous membranes. It clears heat and congestion by aiding elimination via the kidneys through its diuretic effect	PK- , V+(in excess)

Beside all herbs above two herb categories can be useful and helpful in managements of UTIs. First are the Herbs that alkalize urine are which are sarsaparilla, peppermint, marshmallow, comfrey root, plantain, ginger and second are the herbs that destroy pathogenic bacteria and strengthen the immune responses which are Echinacea, Goldenseal, Myrrh, Burdock, Garlic, Bilberry, Uva ursi, Feverfew, Honeysuckle, Barberry.

Body Therapies

“Urinary tract complains should be treated with drug formulation that promotes the flow of urine.

Additionally all patients would need enema and Urethral wash”⁵⁴

Body therapy is part of the management and treatment procedure for patient suffering from any kind of Mutrakrcchra. Table 1-10 shows body treatment therapies that are beneficial for vata, pitta and kapha Mutrakrcchra.

Vataja mutrakrcchra	<p>Massage and oiliation: Whole body massage, Whole body oiliation with medicated oils that are vata alleviating</p> <p>Local massage: the area above the pelvis with warm sesame oil that has been prepared with Ashwagandha</p> <p>Heat therapy: Hot tub bath, local heat above the pelvis</p> <p>Enema: Medicate Niruha basti, Medicate Anuvasanabasti</p> <p>Special treatment: Medicated Uttara Basti(urethral and vaginal douche)</p>
Pitaja mutrakrcchra	<p>Massage and oiliation: whole body massage with cooling oils such as coconut oil, sunflower oil and olive oil,</p> <p>Local massage: use cooling pastes on the area pelvis,</p> <p>Bath: cold affusion, cold bath, cool sitz bath prepared with pitta pacifying herbs such as manjishta, gokshura, amalaki</p> <p>Enema: Medicate Niruha basti, Medicate Anuvasanabasti</p> <p>Special treatment: Virechana(purgation), Medicated Uttara Basti(urethral and vaginal douche)</p>
Kaphaja mutrakrcchra	<p>Massage and oiliation: With medicated oil prepared with bitter herbs</p> <p>Enema: Medicate Niruha basti</p> <p>Special treatment: fomentation therapies, Vamana(emetic therapy), Medicated Uttara Basti(urethral and vaginal douche) with cleansing herbs</p>

Diet and Life style changes

“The key to health can be found not in drugs or in special machine but in the prime factors on which our life and vitality is based. What we ourselves do on an everyday basis, through the factors that maintain life, determines whether we will be healthy or sick.”⁵⁸

Without changing the body and mind inputs there is no root treatment for the diseases. Diet and lifestyle changes are an essential part of the management and treatment procedure for Mutrakrcchra patients. Table 1-11 shows diet and lifestyle remedies which are beneficial for vata, pitta and kapha Mutrakrcchra.

Table 1-11: diet and lifestyle remedies for Vata, Pitta and Kapha Mutrakrcchra ^{59, 60}	
Vataja mutrakrcchra	<p>Diet:</p> <ul style="list-style-type: none"> • Increase intake of water, fluids, oils • Intake of nourishing, lubricated foods and herbs • Sweet taste is the best (if the infection is not sensitive to sugar) • Very small daily dosage of ghee • Avoid cold, dry, sharp very pungent foods • Avoid cold drinks • Drink lots of cranberry juice • Avoid alcohol, coffee, soda • Use Demulcents, antimicrobial, tonic herbs • Use Vitamin A,C • Herbs: Licorice, Gokshura, Turmeric, Guggul <p>Life style:</p> <ul style="list-style-type: none"> • Cultivation of a Satvic life style • Lifestyle to increase ojas(immune system) • Limit too much of physical and mental motions • Daily yoga and daily meditation is essential • Treat anxiety, fear and worry • Gold is the best color and metal to use • Warming and nourishing aromatherapy • Decrease sexual activity to the minimal until the condition gets better • Management of sexual activity
Pitaja mutrakrcchra	<p>Diet:</p> <ul style="list-style-type: none"> • Increase intake of body temprature water, fluids • Bitter taste and herbs are the best avoid pungent, sour and salty tastes • Very small daily dosage of ghee • Drink lots of cranberry juice • Avoid alcohol, coffee, soda • Use Alterative, antimicrobial, tonic herbs • Use vegetarian foods • Use Vitamin A,C • Herbs: Dandelion leaf, Horsetail, Coriander, Manjishta <p>Life style:</p> <ul style="list-style-type: none"> • Cultivation of a Satvic life style • Lifestyle to increase ojas(immune system) • Slow down the fast paste lifestyles

	<ul style="list-style-type: none"> • Daily yoga and daily meditation is essential • Treat anger, intensity, sexual passion • Blue is the best color • Cooling aromatherapy • Decrease sexual activity to the minimal until the condition gets better • Management of sexual activity
Kaphaja mutrakrcchra	<p>Diet:</p> <ul style="list-style-type: none"> • Light diet, purifying diet • Fasting • Avoid cold, heavy, mucosa forming foods • Use bitter and pungent taste and Sweet taste • Avoid soda and juices • Drink a large amount of pure water to flush the urinary system • Avoid alcohol, coffee, soda • Use warm and sharp diuretics • Avoid dairy products, sweet fruits • Full vegetarian diet with use of bitter light greeny vegetables • Use Vitamin A,C • Herbs: Juniper berries, Parsley, Shilajit <p>Life style:</p> <ul style="list-style-type: none"> • Cultivation of a Satvic life style • Add plenty of daily exercise • Daily yoga asanas and warming and vitalizing pranayamas • Treat melancholy, excessive lethargy, attachment • Red and orange are the best colors • Warming and energizing aromas should be applied • Decrease sexual activity to the minimal until the condition gets better • Management of sexual activity

Yoga and Meditation

“Yoga as a therapy for treating diseases, whether physical or mental, is part of Ayurveda and is traditionally employed according to Ayurvedic diagnosis and recommendations.”⁶¹

Urinary tract infection is due to problems of Swadhisthana chakra and as it is related with low immune system it is related to Manipoura and Anahata chakra as well. Thus, asanas that involve pelvis, abdomen and chest region can be beneficial for the condition. Padangusthasana, lotus poses, Bharadvaja's Twist, Bhujangasana, Setu Bandha Sarvangasanathe, Dhanurasana, Dandasana , Marjariasana are beneficial yoga poses for Mutrakrcchra.^{62, 63}

Paranayama and Meditain are benefiacial to manage UTIs. Table 1-12 shows pranayama and chanting mediations which are beneficial for vata, pitta and kapha Mutrakrcchra.

Table 1-12: beneficial pranayama and chanting mediations for vata, pitta and kapha Mutrakrcchra⁶⁴

Vataja mutrakrcchra	Pranayam: warming and vitalizing <ul style="list-style-type: none">• Kapalbhathi• Solar pranayama Meditation: Chanting Vum
Pitaja mutrakrcchra	Pranayam: cooling <ul style="list-style-type: none">• Shitali pranayam• Lunar pranayama Meditation: Chanting Vum
Kaphaja mutrakrcchra	Pranayam: warming and vitalizing <ul style="list-style-type: none">• Kapalbhathi• Solar pranayama Meditation: No chanting, focus more on physical activities, asanas and karma yoga

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