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# "A Holistic Approach to UTI Management: Integrating Preventive Medicine, Social determinants, and Homeopathic remedies with case reports"

Dr. Priyanka B. Chaudasi<sup>1, \*</sup>, M. D MATERIA

MEDICA (PhD), Assistant professor of community medicine, N.H.M.C, Lucknow, Uttar Pradesh, India.

Dr. Neeraj Kumar Jain<sup>2</sup>, M.D (PhD), Professor and HOD N.H.M.C.H, Visnagar, Mehsana, Gujarat, India.

Dr. Harshit Jaiswal, intern, N.H.M.C, Lucknow, Uttar Pradesh, India.

1-Department of Community Medicine, State National Homoeopathic Medical College and Hospital, Lucknow, Uttar Pradesh, India.

2-Department of Human Anatomy, Nootan Homoeopathic Medical College and Hospital, Visnagar, Mehsana, Gujarat, India.

#### Abstract

Urinary tract infections (UTIs) are among the most common bacterial infections worldwide, being in both community and healthcare settings. Although the clinical symptoms of UTIs are miscellaneous and range from uncomplicated (uUTIs) to complicated (cUTIs), utmost UTIs are generally treated empirically. Bacteria are the main causative agents of these infections, although more infrequently, other microorganisms, similar to fungi and some contagions, have been reported to be responsible for UTIs. Uropathogenic *Escherichia coli* (UPEC) is the most common causative agent for both uUTIs and cUTIs, followed by other pathogenic microorganisms, similar as *Klebsiella pneumoniae*, Proteus mirabilis, *Enterococcus faecalis*, and *Staphylococcus spp*. In addition, the prevalence of UTIs caused by multidrug resistance (MDR) is adding, performing in a significant increase in the spread of antibiotic resistance and the profitable burden of these infections. Then, we bandy the colourful factors associated with UTIs, including the mechanisms of pathogenicity related to the bacteria that beget UTIs and the emergence of adding resistance in UTI pathogens. This article reviews various types of UTIs, including their clinical presentation, diagnosis, and treatment approaches, and highlights the role of homeopathy along with preventive and social determinants.

**Keywords:** *uropathogens; acridity factors; pathogenesis; antibiotic resistance; homeopathy; causticum; pulsatilla pratensis; cantharis; nux vomica; sarsaparilla; aconitum napellus; apis mellifica; belladonna; berberis vulgaris; borax; chimaphila umbellata; clematis; equisetum; lycopodium; sepia; staphysagaria.* 

#### Introduction

The urinary system consists of the kidneys, ureters, bladder, and urethra, and its main function is to filter blood by removing waste products and excess water. The urinary system plays a key role in removing the waste products of metabolism from the bloodstream. Other important functions performed by the system are the normalization of the concentration of ions and solutes in the blood and the regulation of blood volume and blood pressure.

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In healthy people, urine is sterile or contains very few microorganisms that can cause an infection. Urinary tract infections (UTIs) are infections that can occur in the urethra (urethritis), bladder (cystitis), or kidneys (pyelonephritis) and are one of the world's most common infectious diseases, affecting 150 million people each year, with significant morbidity and high medical costs. UTIs have a negative impact on patients' relationships, and social, resulting in a decreased quality of life.

UTIs are classified as either uncomplicated (uUTIs) or complicated (cUTIs).

uUTIs typically affect healthy patients in the absence of structural or neurological abnormalities of the urinary tract.

cUTIs are defined as complicated when they are associated with urinary tract abnormalities that increase susceptibility to infection, such as catheterization or functional or anatomical abnormalities (e.g., obstructive uropathy, urinary retention, neurogenic bladder, renal failure, pregnancy, and the presence of calculi). In both community and hospital settings, the *Enterobacteriaceae* family is predominant in UTIs, and the main isolated pathogen is uropathogenic *Escherichia coli* (UPEC).

Antibiotic-resistant Gram-negative bacteria are more current in hospitals than in community samples (e.g., carbapenemase-resistant Enterobacteriaceae). UTIs are substantially caused by bacteria, while the involvement of other microorganisms, similar to fungi and contagions, is relatively rare. *Candida albicans* is the most common type of fungus that causes UTIs. Common causes of viral UTI are cytomegalovirus, type 1 mortal Polyomavirus, and herpes simplex contagion. This review pursues a twofold thing the first is to give an overview of the mechanisms underpinning the pathogenesis of UTIs; the alternate is to give an overview of recent advances in new strategies, as volition to antibiotics, to control the spread of multidrug-resistant UTI isolates.

#### Pathogenesis

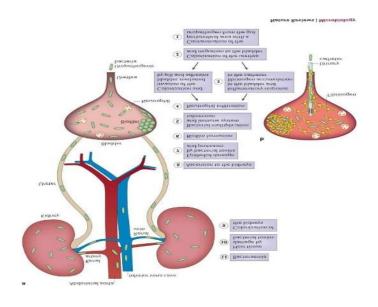


Fig.1- showing pathogenesis of UTIs.

**a** | Uncomplicated urinary tract infections (UTIs) begin when uropathogens that reside in the gut contaminate the periurethral area (step 1) and can colonize the urethra. Subsequent migration to the bladder (step 2) and expression of pili and adhesins results in colonization and invasion of the superficial umbrella cells (step 3). Host inflammatory responses, including neutrophil infiltration (step 4), begin to clear extracellular bacteria. Some bacteria evade the immune system, either through host cell invasion or through morphological changes that result in resistance to neutrophils, and these bacteria undergo multiplication (step 5) and biofilm formation (step 6). These bacteria produce toxins and proteases that induce host cell damage (step 7), releasing essential nutrients that promote bacterial survival and ascension to the kidneys (step 8). Kidney colonization (step 9) results in bacterial toxin production and host tissue damage (step 10). If left untreated, UTIs can ultimately progress to bacteremia if the pathogen crosses the tubular epithelial barrier in the kidneys (step 11).

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**b** uropathogens that cause complicated UTIs follow the same initial steps as those described for uncomplicated infections, including periurethral colonization (step 1), progression to the urethra, and migration to the bladder (step 2). However, in order for the pathogens to cause infection, the bladder must be compromised. The most common cause of a compromised bladder is catheterization. Owing to the robust immune response induced by catheterization (step 3), fibrinogen accumulates on the catheter, providing an ideal environment for the attachment of uropathogens that express fibrinogen-binding proteins. Infection induces neutrophil infiltration (step 4), but after their initial attachment to the fibrinogen-coated catheters, the bacteria multiply (step 5), form biofilms (step 6), promote epithelial damage (step 7) and can seed infection of the kidneys (steps 8 and 9), where toxin production induces tissue damage (step 10). If left untreated, uropathogens that cause complicated UTIs can also progress to bacteremia by crossing the tubular epithelial cell barrier (step 11).

#### **Classification of UTI**

In general, UTIs are named according to the site of infection: urethritis is inflammation of the urethra, ureteritis refers to inflammation of the ureter, and cystitis and pyelonephritis involve the bladder and kidney, respectively. UTIs are further classified according to the presence of predisposing conditions for infection (uncomplicated or complicated) or the nature of the event (primary or recurrent). In most cases, uUTIs are caused by uropathogenic that reside in the intestine and, after accidental contamination of the urethra, migrate, colonizing the bladder. While sharing the same dynamics described for uncomplicated infections, cUTIs occur in the presence of predisposing factors, such as functional or structural abnormalities of the urinary tract. Other typical features of complicated UTIs include a significantly higher rate of treatment failure and systemic or invasive tissue involvement. Three or more uncomplicated UTIs within 12 months or two or more infections within six months define recurrent UTIs; usually, recurrences in this type of infection are due to the same microorganism responsible for the previous infections.

### Epidemiology of urinary tract infections

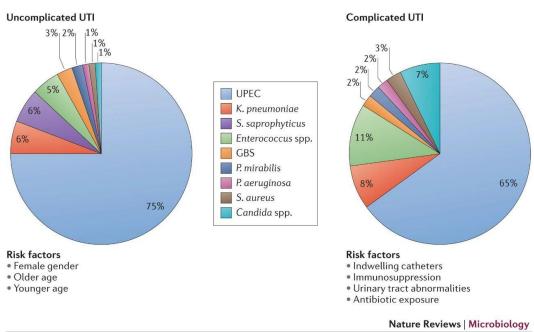


Fig.2- showing epidemiology of UTIs.

Urinary tract infections( UTIs) are caused by a wide range of pathogens, including Gram-negative and Grampositive bacteria, as well as fungi. Uncomplicated UTIs generally affect women, children, and senior cases who are else healthy. Complicated UTIs are generally associated with indwelling catheters, urinary tract abnormalities, immunosuppression, or exposure to antibiotics. The most common causative agent for both uncomplicated and complicated UTIs is uropathogenic Escherichia coli( UPEC). For uncomplicated UTIs, other causative agents are (in order of frequency) *Klebsiella pneumoniae, Staphylococcus saprophyticus, Enterococcus faecalis*, group B *Streptococcus*( GBS), *Proteus mirabilis, Pseudomonas aeruginosa, Staphylococcus aureus,* and *Candida spp.* For complicated UTIs, the other causative agents are (in order of frequency) *Enterococcusspp., K. pneumoniae, Candida spp., S. aureus, P. mirabilis, P. aeruginosa,* and GBS.

#### Diagnosis

The diagnosis of acute uncomplicated cystitis can be made with high probability grounded on a focused history of lower urinary tract symptoms (dysuria, frequency, and urgency) in a case who has no threat factors for complicated UTI. Urine dipstick analysis, as opposed to urinary microscopy, is a reasonable volition to urine culture to diagnose acute uncomplicated cystitis. Urine societies are recommended for cases with threat factors for complicated UTIs and in the following situations (a) suspected acute pyelonephritis; (b) symptoms that don't resolve or reoccur within 2 - 4 weeks after completion of treatment; (c) women who present with atypical symptoms; (d) pregnant women; and (e) manly cases with suspected UTI.

#### Known and possible age-related risk factors for recurrent urinary tract infection (UTI) in women

- Young and premenopausal women
- Sexual intercourse
- Use of spermicide
- ➤ A new sexual partner
- A mother with a history of UTI
- History of UTI during childhood
- Postmenopausal and elderly women
- History of UTI before menopause
- Urinary incontinence
- Atrophic vaginitis due to oestrogen deficiency
- > Cystocele
- Increased post-void urine volume
- Blood group antigen urine secretory status
- > Urine catheterization and functional status deterioration in elderly institutionalized women

A practical point to note is the possibility of urogenital tuberculosis (TB) and malignancy presenting with persistent, non-resolving UTI symptoms. Patients with urogenital TB may have received multiple courses of ciprofloxacin, making the isolation of *Mycobacterium tuberculosis* very difficult, and delaying diagnosis and appropriate therapy. It is also important to consider prostate infections and sexually transmitted infections in all male patients with UTI. However, a detailed description of such infections is beyond the scope of this article.

#### Complications

In some cases, lower UTIs can lead to pyelonephritis. This is a sudden and severe kidney infection.

#### Symptoms include:

- ➢ Fever
- ➢ Flank pain
- ➤ vomiting
- ➢ nausea
- burning urination
- increased frequency and urgency to urinate
- fatigue
- Shaking
- Mental changes
- > Chills

If a person suspects they have a kidney infection, they should seek medical attention as soon as possible. Recurrent or long-lasting kidney infections can cause permanent damage. Some sudden kidney infections can be life-threatening, particularly if bacteria enter the bloodstream in a condition known as septicemia. They can also increase the risk of pregnant people delivering infants prematurely or with low birth weight.

#### Prevention

There are several measures that an individual can take to reduce the risk of developing a UTI:

- drinking 6–8, 8-ounce glasses of water per day.
- emptying the bladder fully when urinating.

- urinating after sexual intercourse.
- > wearing loose-fitting clothing and cotton underwear.
- keeping the genital area clean.
- > avoiding the use of perfumed products on the genitals.
- Females should also wipe from the front to the back to help avoid spreading the germs from the rectum to the vagina.
- ➢ In addition, if a person experiences frequent or recurring UTIs, they should talk with a doctor about switching birth control methods if they use them.

#### **Homeopathic Management**

Homeopathic medicines work wonderfully well on urinary tract infections, whether acute or chronic. Natural and safe, these medicines strengthen the disease-fighting mechanism of the body.

#### 1-Cantharis

Strong urging to urinate—with cutting pains that are felt before the urine passes, as well as during and after may indicate a need for this remedy. Only several drops pass at a time, with a scalding sensation. May feel as if the bladder has not been emptied, still feeling a constant urge to urinate.

#### 2-Nux vomica

Irritable bladder with a constant need to urinate, passing only small amounts, suggests a need for this remedy. Burning or cramping pain may be felt in the bladder area, with an itching sensation in the urethra while the urine passes. The person may feel very irritable, impatient, and chilly. Symptoms may be relieved by hot baths or other forms of warmth.

#### 3-Sarsaparilla

This remedy is often useful in cystitis and often helps when symptoms are unclear, or if other remedies have not been effective. Frequent urging is felt, with burning pain at the end of urination. Urine passes when the person is standing up, but only dribbling occurs while sitting. Flakes or sediment are sometimes seen in the urine.

#### 4-Aconitum napellus

This remedy is often useful when a person feels anxious both before and during urination, with hot, scanty urine, and a burning or spasmodic feeling in the outlet of the bladder. It can also be helpful if retention of urine occurs after a person has been very cold and chilled, or after a shaking experience.

#### **5-Apis mellifica**

This remedy is indicated when the person frequently needs to urinate, but only small quantities are passed. Stinging and burning sensations are felt (especially with the last few drops) and the person may also experience soreness in the abdomen. Heat and touch make the symptoms worse, and cold applications, cool bathing, and open-air bring relief. A lack of thirst is another indication that *Apis*.

#### 6-Belladonna

This remedy may be beneficial if the urging to urinate is frequent and intense, and the bladder feels very sensitive. A cramping or writhing sensation may be felt in the bladder area. Small amounts of highly-colored urine pass. (This remedy is sometimes helpful if a person passes small amounts of blood and no serious cause can be found on medical examination.)

#### 7-Berberis vulgaris

Cystitis with twinges of cutting pain, or a burning feeling that extends to the urethra and its opening, may indicate a need for this remedy. The passage may also burn at times when no attempt at urination is being made. After emptying the bladder, the person feels as if some urine still remains inside. Urging and discomfort are often worse from walking.

This remedy can be helpful for cystitis with smarting pain in the urinary opening and aching in the bladder, with a feeling that the urine is retained. Children may cry or shriek, afraid to urinate because they know the pain is coming. Borax is often indicated for people who are sensitive to noise and inclined toward motion sickness.

#### 9-Chimaphila umbellata

If a person has a troublesome urge to urinate but has to strain (or even stand up and lean forward) to make it pass, this remedy may be useful. Ascalding sensation may be felt while the urine flows, with a feeling of straining afterward.

#### **10-Clematis**

This remedy may be indicated if a person has to urinate frequently with only a small amount being passed. A feeling of constriction is felt in the urinary passage, and the flow may be interrupted, or there may be dribbling afterward. A tingling sensation may occur, lasting long after urination is finished.

#### **11-Equisetum**

If cystitis is accompanied by dull but distressing pain and a feeling of fullness in the bladder, even after urinating, this remedy may be helpful. Urging and discomfort are more intense when the bladder has recently been emptied, improving over time as the bladder becomes more full.

#### 12-Lycopodium

This remedy may be helpful if a person has to urinate frequently during the night and passes large amounts of urine. Or the person may feel a painful urge but has to strain to make the urine flow. Pain may be felt in the back before the urine passes.

#### 13-Sepia

This remedy may be helpful if a person has to urinate frequently, with sudden urging, a sense that urine will leak if urination is delayed, and small amounts of involuntary urine loss. The person may experience a bearingdown feeling in the bladder region, or pressure above the pubic bone. A person who needs this remedy often feels worn-out and irritable, with cold extremities, and a lax or sagging feeling in the pelvic area.

#### 14-Staphysagria

This remedy is often indicated for cystitis that develops in a woman after sexual intercourse, especially if sexual activity is new to her, or if cystitis occurs after every occasion of having sex. Pressure may be felt in the bladder after urinating as if it is still not empty. A sensation that a drop of urine is rolling through the urethra, or a constant burning feeling, are other indications. Staphysagria is also useful for cystitis that develops after illnesses with extended bed rest, or after the use of catheters.

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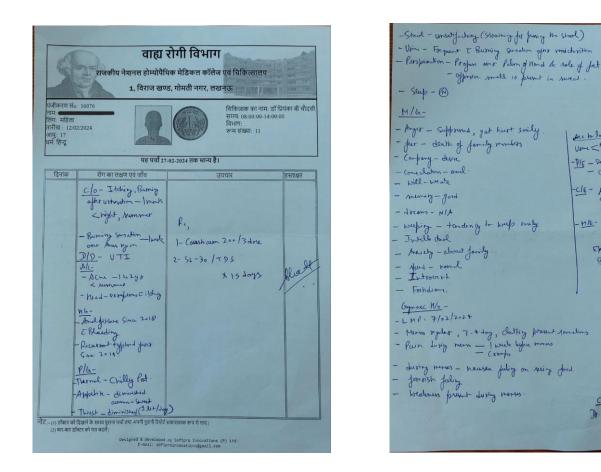
Care taken by -Dr. Horshit Jaiswal (Intern)

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#### **Case Reports**

#### **CASE 1:**



Reg. No.- 1886

Sex-female

Age-17 yrs.

Sex-female

Religion - Hindu

A female patient aged 17 years came to OPD with the following complaints:

Itching over the vulvar region with burning after micturition for approx. one month and burning sensation over the anal region from approx. 1 week. After further interrogation, she said that her problem aggravated in the summer season and during the night. She is also facing the problem anal fissure from 6 years. A patient has a desire for sweet things, and company and the patient has a history of suppressed anger and she gets hurt easily. The patient is also facing mental anxiety about her family.

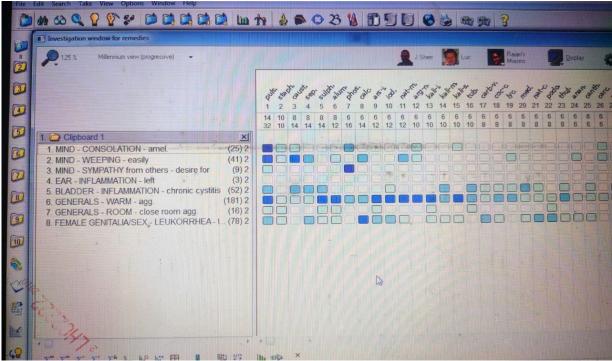
#### **Prescribing totality**

1-itching over genitalia

2-burning micturition

- 3-intolerance of cold weather
- 4- sweet food desire
- 5-mental anxiety from family

**Repertorial result** 



#### Prescription

#### Rx,

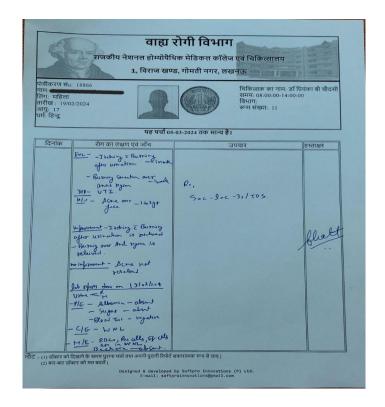
1- Causticum 200 / 3dose

2- SL-TDS x 15 days

#### **Remedial analysis**

Since pulsatilla comes first on repertorisation and has characteristic symptoms of itching and burning micturition but as the patient's mental symptoms are more similar with causticum, so in this case the similimum remedy will be causticum.

#### Follow up 1



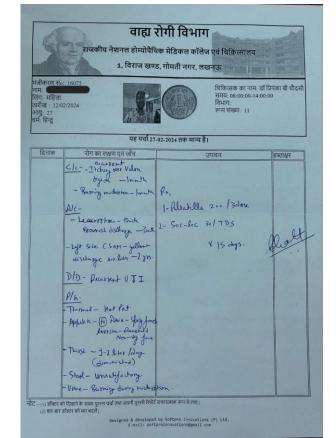
1 -itching and burning after urination is resolved.

2-burning over the anal region is relieved.

3-but the problem of acne over the face is not resolved.

Rx- saclac - tds x 15days.

#### CASE 2:



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- Fear of heights	
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	Care tober by- Dr Horshit Jarswel
	(Intrm)

Reg. No.-16075

Sex- female

Age- 27yrs.

Religion-Hindu

A female patient of age 27 yrs. came to OPD with the following complaints:

Recurrent itching over the vulva region with burning micturition for approx. one month. She is also having a problem of leukorrhea which is thick brownish in colour from approx. three months, she also has a history of c.s.o.m. with yellow discharge from ears from 2 years. On further interrogation she said her problem aggravate in the summer season, she has a great desire for spicy food. The patient has a weeping disposition and she is also facing anxiety from her mother's illness. The patient's menses are also late and scanty.

#### **Prescribing totality**

1-itching over genitalia.

2-burning micturition.

3-intolerance to hot weather.

4-Desire of spicy food.

5-anxiety from mother's illness.

**Repertorial result** 

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#### Prescription

#### Rx,

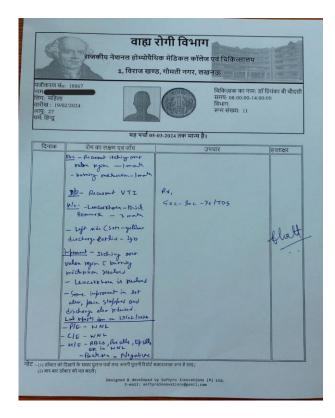
1-Pulsatilla 200 /3dose.

2- Sac-lac /TDS X 15 Days

#### **Remedial analysis**

Although Calcarea carb. comes first on repertorisation, but all the symptoms of itching of genitalia and leukorrhea as well as mental symptoms are pointing this case towards pulsatilla, so in this case the similimum remedy will be pulsatilla.

#### Followup 1



© 2024 IJRAR February 2024, Volume 11, Issue 1 www 1 -itching over the vulva and burning micturition is resolved.

2-leukorrhea is resolved.

3-Some improvement is also in ear pain.

#### Conclusion

A comprehensive study must be performed since urinary tract infections could be brought on by an adverse ailment in the human body to evaluate the efficiency of homeopathic treatment. As demonstrated by the preceding cases, homeopathy is an effective treatment for UTIs. There are many remedies in our Materia medica for urinary tract infections and diseases. A perfect selection of remedies through proper repertorization and dosage can treat the patient without any adverse side effects.

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