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CYSTITIS AND ITS HOMOEOPATHIC MANAGEMENT

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INTRODUCTION

Cystitis is an infection of the lower urinary tract, and more specifically of the urinary bladder. It may be broadly classified as either complicated or uncomplicated (simple).

1. Uncomplicated cystitis refers to a lower urinary tract infection (UTI) in either men or non-pregnant women who are otherwise healthy.
2. Complicated cystitis is associated with risk factors that increase the likelihood and danger of the infection or the chances of failing antibiotic therapy.[1,2]

Etiology

Bacterial infection of the urinary bladder is the usual cause of acute cystitis. Women have high susceptibility due to the relatively short urethral length, close proximity of the rectum to the urethral meatus.

On the other hand, the incidence of simple cystitis in men is relatively low. Males are less prone to UTI due to the longer anatomic urethra, the drier periurethral environment, and the antibacterial defenses of the prostatic fluid.

There is a higher incidence of antimicrobial resistance in complicated infections.[1,2]

Table 1: Causative pathogens in cystitis.[1]

Uncomplicated cystitis	Complicated cystitis
● *Escherichia coli- most common* ● Klebsiella- 2nd most common ● *Enterobacteriaceae* family ● *Staphylococcus saprophyticus* and *enterococcus.* ● Group B *streptococci (rare)* ● *Lactobacillus* coagulase-negative *staphylococci. (rare)*	● *Escherichia coli* ● *Enterobacter* ● *Citrobacter* ● *Serratia* ● *Pseudomonas* ● *Enterococci* ● *Staphylococci* ● Fungi

Epidemiology and Risk factors

About one-third of women will have a UTI by age 24 and half by age 32, with a 12% annual incidence based on self-reports. Risk factors for uncomplicated cystitis include sexual intercourse, spermicide use, a new or multiple sex partner, poor personal hygiene, pregnancy, urinary tract calculi previous UTIs, abnormal urination or urinary tract anatomy, frequent pelvic examinations, incomplete bladder emptying, or inadequacy, bacterial resistance, cystocele, dehydration, diabetes, a strong family history, and post-menopause. Complicated UTI risk factors include nephrolithiasis, immunocompromised status, urinary catheters, instrumentation, renal insufficiency, and urinary tract abnormalities.[1,2]

Pathophysiology

Urine is naturally antimicrobial, with factors like a pH <5, high urea levels, hyperosmolality, and organic acids, proteins, and nitrites helping prevent bacterial growth. Urinary proteins like Tamm-Horsfall glycoproteins, nitrites, and urea inhibit bacterial growth. Frequent urination and high urine volume also lower UTI risk. The bladder wall's mucus lining serves as a barrier to bacterial invasion, and any damage to this mucosal layer increases the risk of UTIs and recurrent infections.[1,2]

Urothelial cells protect the bladder by producing antimicrobial peptides and pro-inflammatory cytokines (IL-1, IL-6, IL-8), encapsulating bacteria, and shedding the superficial layer when heavily infected to reduce bacterial load. In premenopausal women, lactobacilli and acidic vaginal pH prevent uropathogen colonization, but antibiotics can disrupt this defense. UTI-causing bacteria use adhesins to attach to urothelial surfaces, survive hyperosmolality, and raise urinary pH by converting urea into ammonia. The short female urethra increases susceptibility, while glycosuria in diabetics elevates UTI risk. Recurrent infections may impair urothelial and mucus layer recover.[1,2]

Cystitis occurs due to growth of bacteria on the periurethral mucosa originating from fecal or vaginal flora and their ascent to the urinary bladder. The bacteria escape host defence factors via microbial virulence factors to invade urinary tract tissue.

In diabetes predisposing factors include impairment of the immune system and voiding dysfunction from autonomic neuropathy.

In renal insufficiency, accumulation of uremic toxins may impair host defenses, and decreased renal blood flow may reduce antimicrobial clearance. Kidney stones may cause an obstruction providing a potential site of infection. In urinary catheterization, internal and external biofilms may form on the catheter, and pathogens may persist in retained pools of urine in the urinary bladder.[1,2]

History and Physical exam

Uncomplicated UTIs typically cause dysuria, frequency, hesitancy, urgency, suprapubic pain, bladder spasms, and hematuria. They usually don't involve fever, chills, nausea, vomiting, or back/flank pain, which are more common with renal issues or pyelonephritis.[2]

Dysuria along with urinary frequency in the absence of vaginal discharge or irritation is highly predictive of uncomplicated cystitis. Symptoms may be subtle or atypical in the very young and the very old. Urine cloudiness or a "foul odor" in the absence of other signs or symptoms is generally insufficient to justify a diagnosis of cystitis.

Patients with complicated acute cystitis will often present similarly to uncomplicated cystitis. Specific patient populations with complicated cystitis may have atypical symptoms.

When evaluating a patient with symptoms of UTI, it is important to obtain a history of any previous episode of UTI, any recent antibiotic use, or any other risk factors that may predispose one to complicated infection such as diabetes, immunocompromised status, recent urologic procedures or instrumentation, renal transplantation, history of kidney stones, anatomical or functional urinary tract abnormalities, or pregnancy.

A pelvic examination is important in evaluating women with cystitis, especially if they have recurrent urinary tract infections.

In frail and debilitated patients, symptoms like mental or functional status changes, fevers, chills, and falls are often linked to a presumptive UTI diagnosis. However, recent evidence shows that only urinary changes (color, odor, hematuria) and acute dysuria are reliably associated with confirmed UTIs. Treatment for mental status changes includes hydration (for possible dehydration), observation, and assessment for other causes.[1,2]

Evaluation

The diagnosis of acute cystitis is usually made clinically in a patient with signs and symptoms consistent with a lower UTI in combination with laboratory evidence of pyuria and/or nitrites. Urinalysis, when indicated, is the most important laboratory test in diagnosing a UTI. A clean catch sample is usually sufficient. Urethral catheterization could be used in obese women whose uncontaminated sample could not be obtained.[1]

In young children and patients with spinal cord injuries, suprapubic aspiration may be required to collect a proper urine sample. For patients with catheters, the Foley catheter should be changed, and the sample should be collected directly from it, not from the urinary drainage bag. Urine should be sent to the lab immediately or refrigerated, as bacteria can proliferate at room temperature, leading to inaccurate bacterial counts and severity estimates.[2]

Pyuria or leukocytes in a urine specimen are almost always present. The absence of pyuria is suggestive of an alternative diagnosis.

- Normal urine pH is slightly acidic, ranging from 5.5 to 7.5, with a typical range of 4.5 to 8.0. A pH of 8.5 to 9.0 suggests a urea-splitting organism, while an alkaline pH may indicate struvite (infection) kidney stones.
- The nitrate test is the most accurate dipstick test for UTIs, as bacteria are needed to convert nitrates to nitrites. However, some bacteria, like *Enterococcus*, *Pseudomonas,* and *Acinetobacter*, don't convert nitrates and are typically found in complicated UTIs.
- Leukocyte esterase detects WBCs in urine, which release the enzyme in response to bacteria. However, its presence can also indicate other conditions, such as inflammatory disorders or vaginal infections.
- Hematuria can indicate a UTI, as bacterial infections of the bladder's transitional cell lining often cause bleeding. This helps differentiate a UTI from vaginitis and urethritis, which don't typically cause blood in the urine.[2]

A urine culture helps identify pathogens and determine antimicrobial susceptibility. Clinically relevant bacteriuria is indicated by ≥100,000 CFU/mL, while ≥1,000 CFU/mL is significant in men or samples from straight catheterization. A count <100,000 CFU/mL does not exclude a urinary tract infection. Urine cultures are typically unnecessary for acute uncomplicated cystitis but can be valuable for persistent symptoms or presumed treatment failures, especially given rising antibiotic resistance.

Urinalysis and urine cultures should be done before starting antibiotics in all men with acute cystitis symptoms and women with risk factors for complicated UTIs. They are also recommended for atypical symptoms, treatment failure, or symptom recurrence within 2–4 weeks. Women of childbearing age should have a pregnancy test. Men who have recurrent episodes of cystitis should undergo an evaluation for prostatitis.

Antibiotic drug resistance is the main reason to obtain urine cultures in any potentially complicated or difficult infection and in all high-risk patients with urinary infections.

For complicated cystitis unresponsive after 48–72 hours of appropriate antibiotics, further evaluation with upper urinary tract imaging is required. CT is typically preferred for its sensitivity in detecting issues like obstruction, stones, diverticula, or abscesses. Ultrasound, combined with a KUB, may suffice for patients needing to limit radiation exposure. Cystoscopy can also be considered.[1,2]

Management

Acute cystitis is treated with antibiotics, with the choice of agent based on the patient's risk factors for multidrug-resistant organisms. Low-risk patients are treated with first-line or preferred antibiotics, which include: Nitrofurantoin, Sulfamethoxazole-trimethoprim (SMX-TMP), Fosfomycin, Pivmecillinam.

For recurrent UTIs Nitrofurantoin, methenamine, D-mannose are drugs of choice. Vitamin C helps acidify urine to reach the desired pH. Cranberry (juice, pills, extract) shows some efficacy. Estrogen vaginal cream may help postmenopausal women with atrophic vaginitis, while increased fluid intake benefits women with low urinary volumes.[1,2]

Prophylactic treatment is generally recommended for 6 to 12 months. Extending it to 2 years has also been suggested.

Cystitis in men with severe symptoms, anatomical abnormalities, or suspected prostate involvement, fluoroquinolones are recommended as initial empiric therapy, pending culture results and local resistance patterns. Alternatives like doxycycline, SMX-TMP, and cephalosporins can also be used to help reduce quinolone resistance. UTIs in men are typically classified as complicated and carry a risk of progressing to chronic prostatitis, which may manifest weeks or months later. To prevent this, prostate-penetration antibiotics are often recommended for 4–6 weeks to ensure sufficient concentrations in the prostate and reduce the risk of chronic prostatitis.[1,2]

Differential diagnosis

Painful bladder syndrome: Characterized by frequency, urgency, and dysuria without evidence of infection (no pyuria, bacteriuria, or positive cultures); typically a diagnosis of exclusion.

Pelvic inflammatory disease: Presents with pelvic and lower abdominal pain, fever, and potentially cervical discharge.

Prostatitis: Symptoms include ejaculatory pain, vague pelvic discomfort, and a soft, boggy, tender prostate on rectal exam. Urinalysis is usually negative.

Vaginitis: Involves vaginal discharge, itching, odor, dyspareunia, and possibly dysuria, but typically lacks urinary urgency or frequency.

Atrophic vaginitis (Hormonal): Occurs in postmenopausal women with symptoms like vaginal dryness, dyspareunia, thin watery discharge, and pale labia and vaginal lining.

Urethritis: Marked by pyuria on urinalysis without bacteriuria. Common in sexually active women.[1,2]

Prognosis

Patients with uncomplicated cystitis usually experience symptom improvement within three days of starting antibiotics. Recurrent cystitis occurs in 25% of women within six months of their first UTI, with higher rates in those with multiple prior UTIs. Complications, such as bacteremia and sepsis, are rare when appropriately treated.

Emphysematous cystitis is a rare, serious complication of UTIs, with gas formation in the bladder wall and potential fatality if untreated. Diabetes is the primary risk factor, along with factors like female gender, immunocompromised states, urinary retention, and chronic UTIs. Treatment includes antibiotics and catheter drainage; about 10% may require surgical resection due to necrotizing infections.[1,2]

Complications of cystitis

- Chronic prostatitis
- Emphysematous pyelonephritis and cystitis
- Focal renal nephronia
- Hypertension
- Incontinence
- Persistent lower urinary tract symptoms
- Prostatic abscess
- Pyelonephritis
- Renal abscess
- Renal failure
- Staghorn urinary calculi[2]

Homoeopathic management[3,4,5,6,7]

1. **Aconitum napellus** - High fever, restlessness, constant urging, yet fearful of voiding urine, on account of the painfulness of the act. Urine scalding hot, micturition painful, difficult, sometimes only drop by drop. children reach with their hands to the genitals and cry out. Scanty, red, hot urine tenesmus and burning at neck of bladder. Profuse micturition, with profuse perspiration and diarrhoea. Dysuria with hypogastric pain.

2. **Apis mellifica** - Great irritation at the neck of the bladder, with frequent and burning urination, frequent desire, with passage of only a few drops, difficult urination of children. urine scanty, high-colored, hot, red, and bloody milky and frothy, very fetid, sediment reddish brown like coffee grounds. Last drops burn and smart.

3. **Arsenicum album** - Burning pain, especially at the commencement of urinating. Fever, great restlessness, cold perspiration, face and extremities cold. Chronic cystitis, with inability to void urine, Bladder greatly distended and paralyzed, urine turbid, mixed with pus and blood. After urinating feeling weakness in abdomen. Diabetes.

4. **Belladonna** - Retention of urine with acute urinary infection. Rapid sinking of strength, the region of the bladder very sensitive to the touch, urine hot and fiery red. Urine clear at first, but soon becoming turbid on standing and depositing a copious, slimy, bright-red, bran-like sediment. Frequent and profuse urination where no pathological condition is found. Incontinence or continuous dropping of urine.

5. **Camphora** - Antidotes the effect of drugs acting on kidneys and bladder. complete suppression of urine, slow and thin stream. Burning in urethra and bladder. Urine yellowish green, turbid and mouldy smell. Retention of urine.

6. **Cannabis sativa** - Gonorrhoeal cystitis, burning smarting in the urethra. Complete suppression of urine, or constant urging to urinate, especially at night, with burning pains, passes only drops of bloody urine. Urine scalds with spasmodic closure of sphincter. Urethral caruncle, phimosis. zigzag pain along with urethra. Retained urine with obstinate constipation.

7. **Cantharis vesicatoria** - Spasmodic pains in the perineum, along the urethra down into the testes, which are drawn up, intolerable burning pain in the bladder, cutting through the abdomen, violent tenesmus and burning in the bladder, violent, but ineffectual urging to urinate, with drop-discharge of a saturated dark urine, stinging and burning pains in the region of the bladder, before and after micturating or cutting pains from the kidneys to the bladder, abdomen distended and painful to contact, especially in the region of bladder. Vomiting and nausea, great thirst, but drinking, and even the sight of water increases the pain. Nephritis with bloody urine. Jelly-like urine.

8. **Carbo vegetabilis** - In old people and chronic cases, where the acute inflammation has subsided and only blennorrhea remains. Diminution of secretion of urine. Urine red and very deep coloured as if blood is mixed with urine. Copious urine, clear yellow colour or thickish and whitish. Diabetes.

9. **Chimaphila umbellate** - Frequent and profuse discharge of urine, loaded with mucus; urging to urinate after voiding it; pressing fullness in the region of the bladder. Haematuria. urinary complaints with acute prostatitis, retention of urine and sensation of a ball in the perineum. Diabetes.

10. **Colocynthis** - After alleviation of the most violent symptoms, when the pain during micturition extends all over the abdomen, the urine looks turbid when first voided, depositing, on standing, a tough, mucous sediment, which can be drawn into strings. Vesical catarrh, discharge like fresh white of an egg. Cystitis with dysuria.

11. **Conium maculatum** - Cutting-drawing through the urethra while urinating, sharp stitches worse when walking, shortly after urinating in the region of the neck of the bladder, shooting stitches in the back part of urethra. Difficult emission of urine. Nocturnal urination. The urine suddenly stops and not being flow for some movements. Burning and shooting in the urethra especially after passing urine.

12. **Copaiva officinalis -** Burning pressure; painful micturition by drops. Retention, with pain in bladder, anus, and rectum. *Catarrh of bladder*; dysuria. Swelling of orifice. Constant desire to urinate. Urine smells of violets. Greenish, turbid color; peculiar pungent odor.

13. **Eupatorium perfoliatum -** Constant desire to pass water, accompanied by a cutting aching pain in the bladder, most excruciating burning and smarting in the urethra during the passage of urine; passes a few drops at a time, and is obliged to try it often. Dark colour or dark-brown, scanty urine, depositing a whitish, clay like sediment in urine.

14. **Kalium carbonicum -** Violent cutting and tearing in the bladder, neck of the bladder and urethra; urine hot, scanty, frequent, flows slowly, with soreness and burning, and deposits a red, slimy, or purulent sediment. Involuntary urination when coughing, sneezing.

15. **Lachesis mutus** - Frequent want to urinate with cutting pain in abdomen. Catarrh of bladder, with discharge of offensive mucus during micturition, urine almost black, foamy. Paralysis of bladder. Small tumour in urethra with retention of urine. Ineffectual urging to urinate. Urine turbid and brown or red or deep yellow. Burning when it does pass. Feeling as of a ball rolling in the bladder or abdomen when turning over.

16. **Lycopodium clavatum** - Feeling of heaviness in the bladder. Burning during micturition, constant urging to urinate, passing into retention of urine. Urine dark or turbid, milky, flocculent, with thick purulent sediment of a nauseous odor. fever, with general malaise and gastric ailments, frequent urging to urinate, forcing one to retain the urine and to support the abdomen with the hands. Disposition to urinary concretions, in children urging to urinate, with impossibility to pass it, they cry impatiently and grasp the abdomen, when they discharge, the urine may be pale and clear. Patient will get into the position to urinate but wait a great while before the urine comes. Urine burning hot, like molten lead.

17. **Mercurius** - Urine acrid turbid too frequent. Fever, with chilliness, great soreness in the region of the bladder when touching it. violent urging, the urine flows in thin stream, or only drop by drop, containing mucus, blood, or pus. During micturition sweat breaks forth, syphilitic gonorrhoea. Affection of urethra-continued want to urinate, day and night.

18. **Nux vomica** - Frequent urging to urinate, with violent pains during and after micturition, which is very scanty, burning pain in urethra, bladder, and kidney. Contractive pain in urethra while urinating, constipation, haemorrhoids, after drugs or suppressed gonorrhoea. Urine reddish with sediment, brick-dust colour, turbid with dirty yellow sediment in morning or when thinking.

19. **Polygonum** - Painful cutting and feeling of constriction and strangulation at the neck of the bladder while urinating, lasting a long time after, pains in bladder. Frequent and profuse discharge of clear, white, or straw-colored urine. Inflammation of kidney from cold with cutting pains along with ureters to bladder.

20. **Populus** - Urine scanty, containing a large quantity of mucus and pus, with severe tenesmus, as soon as the last drops are voided or a little before. Catarrh of the bladder, especially in elderly persons, with ardor urine or perfect retention, chronic gleet.

21. **Pulsatilla** - After exposure to cold the urine deposits a slimy sediment, which sticks to the vessel; tenesmus and stinging in the neck of the bladder; the pain continuing awhile after micturition. Urine very scanty bloody, reddish colour. Retention of urine with heat in region of bladder. Involuntary micturition. Haematuria.

22. **Sepia** - Distension of the lower part of abdomen, annoying itching sensation in the region of the bladder, with urging to urinate, especially at night. During and after micturition chilliness and heat in the head, periodical discharge of mucus with the urine. Sometimes pieces of coagulated mucus clog up the urethra. Very offensive urine. Cramps and burning sensation.

23. **Sulphur** - Urine mixed with mucus or blood. Burning in urethra during micturition, constant desire to urinate, day and night. After micturition the pain continues in the urethra until a new urging ensues, stool also painful. Soreness of parts over which it passes. Must hurry sudden call to urinate. great quantities of colourless urine. Feverish

and sleepless during the night, suppressed or visible cutaneous eruptions, gonorrheal discharges, haemorrhoids.

24. **Tarantula** - Cystitis, with high fever, gastric derangement, excruciating pains, and impossibility to pass a drop of urine. The bladder seems swollen and hard, great tenesmus from spasmodic action, debilitating the patient, who passes only by drops a dark-red, brown, fetid urine, with a gravel-like sediment.

25. **Terebinthina** - Sensitiveness of hypogastrium, tenesmus of bladder, strangury and pains in urethra, violent burning and cutting in bladder, alternating with a similar pain at the navel, worse at rest, less when walking in open air. Urine retained from atony of the fundus vesicae, catarrh of the bladder in old persons of sedentary habits. Scanty, suppressed odor of violets. Urethritis with painful erections.

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