



The Truth About UTIs and Asymptomatic Bacteriuria



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Acute cystitis is extremely common with 40% to 50% of women reporting at least one urinary tract infection (UTI) in their lifetime. UTIs are much less common in men.

Pathogenesis

In women, UTIs develop when uropathogens from the fecal flora colonize the vaginal introitus, enter the urethra and bladder and then stimulate a host response. Occasionally, both men and women can develop infection from hematogenous spread, particularly when the isolated pathogen is *Staphylococcus aureus*.

Predisposing factors

In women of childbearing age, sexual intercourse is the most important risk factor. The use of spermicidal jelly is thought to further increase the risk of developing a UTI by altering the vaginal flora in favour of colonization with urinary pathogens.¹ In post-menopausal women, a history of > six UTIs and the presence of insulin-treated diabetes mellitus are the most important risk factors for the development of subsequent UTIs.²

In men, most UTIs occur in the elderly and are associated with urologic abnormalities, such as bladder outlet obstruction (e.g., due to prostatic hyperplasia) or instrumentation.

Meet Kara

- Kara is a 35-year-old sexually active woman who presents with dysuria and frequency
- She has a positive leukocyte esterase test
- You prescribe a three-day course of trimethoprim/sulfamethoxazole, but she returns in a week with recurrence of her symptoms

How can you help Kara?

An uncomplicated urinary tract infection (UTI) can be treated with a three day course of antibiotics, but 10% to 20% fail. If there is a recurrence of symptoms, there are several possibilities:

1. There is an upper tract infection requiring longer therapy.
2. The organism is resistant
3. There is an alternative diagnosis (e.g., bacterial vaginosis, sexually transmitted infection)

A urine culture should be done and if the culture is positive, the patient should be treated for two weeks based on sensitivities.

For another case, go to page 68.

Microbiology

Escherichia coli is the causative pathogen in approximately 80% to 85% of episodes of acute uncomplicated cystitis. *Staphylococcus saprophyticus* is responsible for most other episodes,



Meet Katherine

- Katherine is a 35-year-old sexually active female who has a history of four to five UTIs per year, for the past three years
- She is tired of this and she wants to know what treatment options she has

What are the treatment options for Katherine?

Both continuous prophylaxis or self-treatment are options in this case.

For another case, go to page 69.

while *Proteus mirabilis*, *Klebsiella* species and *Enterococci* or other uropathogens are isolated from a small number of patients. All uropathogens possess certain virulence factors that allow adherence to uroepithelial cells, resulting in colonization and/or infection. If *Staphylococcus aureus* is isolated, in the absence of a urinary catheter, one should consider the possibility of a hematogenous source like endocarditis.

Clinical presentation

Acute uncomplicated cystitis is manifested primarily by dysuria, usually in combination with frequency, urgency, suprapubic pain and/or hematuria (which represents hemorrhagic cystitis).

Patients with urethritis and vaginitis may also complain of dysuria, thereby presenting a diagnostic challenge. Urethritis caused by *Neisseria gonorrhoeae* or *Chlamydia trachomatis* should be looked for, if the urine has white blood cells (WBCs), but no bacteria (sterile pyuria).

Vaginitis should be considered in the presence of:

- vaginal discharge or odor,
- pruritus,
- dyspareunia,
- external dysuria and
- the absence of frequency or urgency.

In one systematic review, the combination of dysuria plus frequency, in the absence of vaginal discharge or irritation, predicted cystitis with > 90% probability.³

The following suggest an upper tract infection and should prompt more aggressive diagnostic and therapeutic measures:

- Fever (temperature > 38 C)
- Flank pain
- Costovertebral angle tenderness
- Nausea
- Vomiting

Diagnosis

A directed history and physical should provide enough information to make an accurate diagnosis of acute uncomplicated cystitis. A pelvic examination should be done if there are features of urethritis or vaginitis, or if the diagnosis is in doubt.

The urinalysis or leukocyte esterase test can be helpful in making a diagnosis of acute cystitis, as > 90% of those with symptomatic UTI will have pyuria. However, the presence of pyuria does not translate to a diagnosis of a UTI. The presence of WBC casts indicates kidney involvement. If there is no pyuria, but symptoms are present, the symptoms are more likely to be due to trauma, allergy or a chemical irritation.

Urine cultures are generally not necessary in women with uncomplicated cystitis, as the causative organisms and their antimicrobial susceptibility profiles are predictable and culture results generally become available only after the patient's symptoms have improved or resolved.

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Meet Kelly

- Kelly is a 65-year-old asymptomatic woman who undergoes a urinalysis as part of her yearly exam
- Kelly's urinalysis shows 15 to 20 white blood cell count/high-powered field
- On seeing this, the physician orders a urine culture, which shows 10^8 cfu/L *Escherichia coli*

What is the appropriate management for Kelly?

This woman has asymptomatic bacteriuria and she is not pregnant. Therefore, she does not require antibiotic treatment.

Urine cultures should be done in the following situations:

1. The patient is suspected of having a complicated infection
2. The symptoms are not characteristic of a UTI
3. The patient has persistent symptoms of a UTI following treatment and a new antibiotic regimen is to be started
4. UTI symptoms recur < one month after the treatment of a previous UTI, for which no culture was performed. In this case, a new antibiotic regimen is to be started
5. The patient is male

Asymptomatic bacteriuria

Asymptomatic bacteriuria refers to the presence of high quantities of a uropathogen (generally $> 10^8$ cfu/L) in the urine of an asymptomatic person. The prevalence asymptomatic bacteriuria varies according to sex and age. Women of child-bearing age have a prevalence of 3% to 6%. In post-menopausal women, the prevalence increases to 10% to 20% and in men > 65 years of age, the prevalence is approximately 10%.

Clinical trials have documented harmful outcomes (*i.e.*, adverse drug effects and reinfection with resistant organisms) and have not documented any benefits for treatment in most patients with

asymptomatic bacteriuria. However, treatment is indicated in renal transplants, in the presence of urinary obstruction and in pregnancy.⁴

Treatment

Three-day, short-course regimens are recommended for uncomplicated cystitis and have been shown to be superior to one-day treatments, but are equal in efficacy to a longer duration of treatment.⁵ Trimethoprim/sulfamethoxazole is considered first-line empiric therapy. Other options include⁶:

- ciprofloxacin,
- nitrofurantoin and
- trimethoprim.

A follow-up urine culture is not indicated in the treated patient who becomes asymptomatic following therapy since there is no evidence that asymptomatic bacteriuria following treatment for symptomatic lower UTI should be treated.

A seven-day to 1-day course of treatment is indicated in the following patients:

1. Men
2. If symptoms are present for $>$ one week
3. If predisposing factors are present, such as:
 - neurogenic bladder,
 - catheterization and
 - anatomical abnormalities
4. If the patient has undergone a renal transplant
5. When symptoms are suggestive of pyelonephritis

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