

Urinary Tract Infection

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ABSTRACT

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UTI is a common problem in our day to day practice. The clinical presentation; etiology and management differ in different age groups and between males and females. Asymptomatic bacteriuria does not require treatment except in pregnancy, genitourinary instrumentation and in renal allograft recipients. Complicated UTI warrants relief of obstruction and intensive treatment with antibiotics. UTI rarely occurs in men. Hence even uncomplicated UTI in males require further detailed investigation to rule out underlying structural or functional abnormality of urinary tract and appropriate intervention.

Keywords: Urinary tract infection, Asymptomatic UTI, Evaluation

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Urinary Tract infection (UTI) is the presence of pathogenic microorganisms within the normally sterile urinary tract. Infections are predominantly bacterial, although fungus, virus, parasites may occasionally be pathogens. UTI is the most common bacterial infection in humans and can be either symptomatic or asymptomatic.

DEFINITIONS

Asymptomatic UTI is isolation of bacteria from urine in quantitative counts ($\geq 10^5$ CFU/ml) consistent with infection but without localising genitourinary or systemic signs or symptoms attributable to the infection.

Symptomatic UTI: As the name implies symptomatic infection is associated with symptoms ranging from mildly irritative voiding symptoms to severe septicemia causing high morbidity.

Recurrent infection: It may either a relapse or are infection.

Relapse: Recurrence after therapy with a pre therapy isolate

Re infection: Recurrence with a different organism.

Uncomplicated UTI: Infection in a functionally or structurally normal urinary tract

Complicated UTI: UTI in an abnormal Urinary tract.

The microbiologic diagnosis of UTI requires isolation of a pathogenic organism in sufficient quantita-

tive amounts ($>10^5$ CFU/ml) from a urine specimen collected to minimize contamination.

Acute Uncomplicated UTI (cystitis): More common in women (60%), higher incidence in young sexually active women. E.Coli is isolated in 80-85% cases. Staphylococcus saprophyticus in 5-10% of cases. Klebsiella pneumonia and proteus species are isolated in 2-3% of cases. Women with this syndrome usually have family h/o similar illness, and often are nonsecretors of blood group substances. Sexual activity is strongly associated with infection.

Symptoms of new onset frequency, dysuria, urgency together with the absence of vaginal discharge abdominal pain are useful to diagnose infection in the majority. Any quantitative count of a potential uropathogen with pyuria is considered sufficient for diagnosis in the presence of consistent symptoms. A urine specimen for culture should be obtained before initiating antibiotic treatment in the setting of uncertainty about diagnosis, failure of therapy, or early recurrence after therapy. The differential diagnosis include urethritis due to sexually transmitted diseases such as Neisseria gonorrhoeae or Chlamydia trachomatis, yeast vulvovaginitis, and genital herpes. Antimicrobial therapy started according to patient tolerance, documented efficacy for treating UTI, and local prevalence of drug resistance in community acquired E.coli. Cotrimoxazole, Quinolones, Betalactams have been used. For uncomplicated UTI 3 days of treatment is often sufficient. For women with duration of symptoms more than 7 days, those with early recurrence of symptoms (<30

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days) and in those who are treated with nitrofurantoin or betalactam antibiotics with frequent recurrence of acute cystitis mandate chemoprophylaxis (low dose long term antibiotics given at bed time for a period of 6-12 months). Postintercourse prophylaxis is most appropriate for women who identify sexual intercourse as precipitating factor for recurrent symptomatic episodes. Avoiding use of spermicide and daily intake of cranberry decreases infection by 30%.

Acute Nonobstructive Pyelonephritis: symptomatic kidney infection occurring in women with an otherwise normal genitourinary tract. Risk factors and the bacteriology is similar to that of cystitis. Strains of E.coli isolated express virulence factors like P.fimbria, adhesion, hemolysins, aerobactins etc.

Classical presentation is with fever, costovertebral angle tenderness and pain. There may be associated lower urinary tract symptoms. Fever may be low grade or it may be absent. Bacteremia is common (10%) in elderly and diabetic. If patient develops septic shock then urgent Ultrasound abdomen to rule out underlying obstruction is important. Most of the patients can be treated with oral antibiotics. But if they develop hemodynamic instability or do not tolerate oral antibiotics, they may be hospitalised and parenteral antibiotics may be started along with other symptomatic and supportive treatment. Usually symptomatic improvement occurs in 48- 72hrs following which oral antibiotics may be continued. If no improvement occurs within this period, underlying abscess formation or obstruction should be excluded.

Complicated UTI: The most important host defence preventing UTI is intermittent unobstructed voiding of urine. Any abnormality that impairs voiding may increase the frequency of voiding. UTI in individuals with structural or functional abnormalities of the urinary tract, including those who have undergone instrumentation is considered to be "complicated" UTI.

Clinical presentation varies from mild irritative lower tract symptoms to systemic manifestations such as fever and even septic shock. Individuals with complete obstruction of urine flow are at increased risk. Microbiology is similar as above. A quantitative count of $>10^5$ CFU/ml remains the standard for microbiologic diagnosis. Organisms isolated are less likely to express virulence factors, because host abnormality of impaired voiding is itself sufficient for infection. If prolonged antibiotic therapy has been given for prolonged periods reinfection may occur with yeast species or with highly resistant organisms such as *Pseudomonas aeruginosa*

strains.

Treatment: Antimicrobial treatment is based upon the clinical presentation, patient tolerance and known or suspected susceptibilities of the infecting organism.^{1,2} For patients with lower urinary tract symptoms 7 days therapy is sufficient. If fever or other systemic symptoms are present, 10 to 14 days of therapy is recommended. Complicated UTI can be prevented if the underlying genitourinary abnormality is corrected, and there is a high likelihood of recurrent infection if it cannot be corrected. Prophylactic antibiotics are not recommended as it favours emergence of more resistant organisms. In selected patients with severe symptomatic recurrences and an abnormality that cannot be corrected, long term suppressive therapy may be considered. This therapy is individualised in every case. Full therapeutic antimicrobial doses are initiated and may subsequently be decreased to one half the regular dose if the urine culture remains negative and the clinical course is satisfactory.

Asymptomatic UTI does not require treatment except in pregnancy (to prevent negative foetal outcomes –low birth weight and premature delivery), invasive genitourinary procedure, renal transplant recipients. Asymptomatic bacteriuria occurs with increased frequency in patients who also experience symptomatic UTI, suggesting that the biologic defect promoting UTI is similar. 50-90% of them will have pyuria

UTI in pregnancy: hormonal changes in pregnancy produce hypo tonicity of autonomic musculature, leading to urine stasis. In addition obstruction at pelvic brim ($R>L$) occurs as foetus enlarges, more marked during third trimester. This explains the increased risk of pyelonephritis at this stage. 75 to 90% of acute pyelonephritis in pregnancy can be prevented by identification and treatment of asymptomatic bacteriuria early in pregnancy. So all pregnant women should be screened for bacteriuria between 12 and 16 weeks of gestation. If significant bacteriuria is identified it should be confirmed with a second urine culture and if confirmed treated. The choice of antibiotic depends upon the susceptibility of organism and its safety in pregnancy. For lower UTI 3-5 day course of cephalexin, nitrofurantoin is sufficient. Cotrimoxazole should be avoided in early pregnancy. For upper UTI, patients who are toxic or with hemodynamic compromise are hospitalised and given parenteral antibiotics and fluids. They may be treated for two weeks. These patients are followed up with monthly urine cultures throughout the remainder of their pregnancy to identify recurrent infection. If second episode occurs they should be continued on

low dose chemoprophylaxis after treating the acute infection, usually with cephalexin, cephadroxyll or nitrofurantoin until delivery.²

UTI in men: Men rarely present with acute uncomplicated UTI or acute Nonobstructive pyelonephritis. E.coli is the usual infecting organism. Men with UTI should be investigated for the possibility of underlying abnormality. Pelvic and kidney Ultrasonography is the most useful initial test. Elderly men have an increased frequency of UTI due to prostatic hypertrophy leading to obstructive and turbulent urine flow. These men also develop chronic bacterial prostatitis. Once bacteria are established in prostate it is difficult to eradicate the organism resulting in recurrent symptomatic or asymptomatic UTI. The antibiotics diffuse into the prostate poorly hence this can act as nidus for infection. A prolonged course of antibiotics (6-12 weeks) often required to eradicate the focus of infection in the prostate. Cotrimoxazole or quinolones are often recommended as the first line drugs.

Fungal UTI: Has been increasing in frequency. It is primarily a nosocomial infection occurring in patients with diabetes, indwelling urethral catheters and on intense broad spectrum antibiotic therapy. Candida albicans is the most common species isolated, but other Candida species, such as C.glabrata,krusei,parapsilosis and tropicalis also are observed. Most of them have multiple medical problems, so the clinical importance of this fungal infection is difficult to assess. If patients remain asymptomatic treatment is not warranted. Indwelling catheters if present may be removed if possible. Fungal balls may lead to obstruction and should be excluded in patients with obstructive uropathy with candidemia or candiduria. If repeated cultures shows growth of fungi >10⁴ CFU/ml and if patients are symptomatic funguria should be treated..

Fluconazole 100-400mg/dayX7 days recommended. Candida species other than C.albicans are more likely to be resistant to fluonazole and Amphotericin B may

be necessary for treatment. The newer agents like caspofungin and voriconazole are used appropriately. The cure rate with any treatment is only 70-75%, But assessment of outcome is often limited by serious accompanying illnesses.

In short, UTI is a common problem in our day to day practice .The clinical presentation; etiology and management differ in different age groups and between males and females. Asymptomatic bacteriuria does not require treatment except in pregnancy, genitourinary instrumentation and in renal allograft recipients. Complicated UTI warrants relief of obstruction and intensive treatment with antibiotics. UTI rarely occurs in men. Hence even uncomplicated UTI in males require further detailed investigation to rule out underlying structural or functional abnormality of urinary tract and appropriate intervention.

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