

Urinary Tract Infection (UTI) still a Force to be Reckoned with

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PREPHASE

Burning pain, frequent urge to urinate is the first sign of a UTI. It is due to bacteria in the urethra or bladder. Frequent urination is another red flag for an infection. Urine produces peculiar even foul odor and smoky, cloudy. Urine appears pinkish or reddish due to the presence of blood. Young women are commonly infected. Prostate hypertrophy is linked to male disease. It is affecting almost 4 million people in US alone. The chance of UTI is more in women. In females, it affects the bladder and urethra. Women who use diaphragms, spermicidal agents are more at risk. Menopause women are more vulnerable to infection. Infection of upper urinary tract, consisting of the kidney and pelvis, is known as pyelonephritis. Infection of the lower tract may involve the bladder (Cystitis), urethra (Urethritis) or prostate (Prostatitis). Intercourse is common association of UTI. Catheters increase the risk. Obstruction of urinary flow increase the risk. Bacterial adherence favors persistence. Fever is usually absent. Enterobacteriaceae and gram positive bacteria appear with complications. Back and perirectal pain are the signs of UTI. Pyuria suggests UTI but not specific. Chronic disease is the source of cystitis. Kidney infection results in permanent kidney damage. Take plenty of water/fluids to flush out bacteria. Wipe front to back. This helps the spread of bacteria from the anus into the bladder. Decreased estrogen levels during menopause cause changes that make the urinary tract more susceptible to bacteria. Most patients with UTI have uncomplicated cystitis, which is one of the most common infections in the United States, especially in sexually active women. Escherichia coli is the most common cause of urinary tract infection. Staphylococcus saprophyticus is a frequent cause of cystitis in women, probably related to its occurrence as a part of normal vaginal flora. Klebsiella, Enterobacter, Proteus, and Serratia are the primary opportunistic and often nosocomial pathogens. Pseudomonas aeruginosa is an opportunistic pathogen and a major cause of hospital-acquired infections.

Keywords: Escherichia coli, Klebsiella, Pseudomonas aeruginosa, Enterobacteriaceae, uncomplicated cystitis, cefaclor,

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1 Introduction

Invasion of rectal bacteria by direct extension or by lymphogenous or hematogenous spread may also constitute other possible routes.(1)Due to several anatomical and hormonal changes, pregnant women are more susceptible to develop Urinary tract infections (UTI) (2). UTI is a major health problem,it has been reported among 20% of the pregnant women and it is the most common cause of admission in obstetrical wards.(3)

Although various microorganisms can cause UTI, Escherichia coli is the most common cause of disease in 80%–90% of cases. (4,5)

Staphylococcus saprophyticus as a second agent is a distant second to E.coli,causing 5 to 10% of infections.S.saprophyticus presents as a more aggressive disease with more approximately one half of the patients showing involvement in the upper urinary tract. (6) Urinary tract infections also account for up to 40% of nosocomial infections catheters these hospital acquired infections tend to be more serious because the bacteria resistant to drug treatment and patients are often in poor general health.(7)

Clinical characteristics, etiology and antimicrobial susceptibility patterns may differ from country to country.(8)

Antibiotics are administered only if gas formation is localized in the renal pelvis and there is no invasion in the kidney parenchyma. .(9). During urinary tract infections, invading bacteria may either promote or prevent host cell death by interfering with cell death pathways.(10)

Uncomplicated urinary tract infections (UTIs) are common in otherwise healthy individuals. Half of all women will get one or more UTIs before reaching their mid-30s, and recurrent infections are frequent also in women without any anatomical abnormalities in the urinary tract (11,12)

Urinary tract infections (UTIs) are a severe public health problem and are caused by a range of pathogens, but most commonly by Escherichia coli, Klebsiella Pneumoniae, Proteus mirabilis, Enterococcus faecalis and Staphylococcus saprophyticus..(13)

As the most common bacterial infection that requires medical care, UTIs vary greatly by clinical presentation and therapeutic management. Urinary tract infections affect a variety of patients with different biological and procedural risk factors(e.g., age, sex, pregnancy, catheters and urologic interventions).However, not all bacteria require antibiotic therapy,particularly in the presence of ASB. Antibiotic stewardship practices are essential to promote judicious antibiotic use for UTIs. This can significantly reduce antibiotic resistance because UTIs are the most common infections leading to an antibiotic prescription.(14)

Procalcitonin (PCT) as a potential biomarker that can help in differentiating between lower UTI and pyelonephritis in the pediatric age group.(15)

Uropathogenic Escherichia coli is the causative agent for >80%of uncomplicated urinary tract infections (UTIs). Uropathogenic E. coli strains express a number of virulence and fitness factors that allow successful colonization of the mammalian bladder.(16)

,MAPK activators, and lymphocyte signaling molecules.(17)

Diseases Group of the French Pediatric Society set up an active surveillance network in pediatric centers across France in 2014.(18)

Clear instructions for the interpretation of urine cultures by the laboratory technicians are indispensable to obtain standardized, reliable, and clinically useful results.(19)

Congenital abnormalities of the kidney and urinary tract have a high prevalence (3.5-43% in pediatric population).(20)

2 History

It was described by the Egyptians as "sending forth heat from the bladder.(22) Effective treatment did not occur until the development and availability of antibiotics in the 1930s before which time herbs, [bloodletting](#) and rest were recommended (21) Urinary tract infections have been described since ancient times. The first written description, found in the Ebers Papyrus, dates to around the 1550 BC.(23)The Egyptians described a urinary tract infection as "sending forth heat from the bladder(24)

Herbs, bloodletting, and rest were the common treatments until the 1930s, when antibiotics became available.(23)

3 Significant Gap in Research

In most cases, UTIs can be diagnosed just from the symptoms and there is no need for laboratory testing.. The urine is tested for urinary nitrites, white blood cells (leukocytes), or leukocyte esterase.. However, women with negative cultures can still improve with antibiotic treatment (25) UTI symptoms in old people can be vague, and diagnosis can be difficult as there is no really reliable test (26) It is a common urological condition. Sometimes it is impossible to eradicate it because of the development of drug-resistant bacteria. So the wrong therapy is likely to make sensitive organism resistant to drugs. Hence prior isolation of causative organisms and their sensitivity to antimicrobial drugs should be done before any rational treatment is given to the patient.(27)

Staphylococcus saprophyticus is a frequent cause of cystitis in women, probably related to its occurrence as a part of normal vaginal flora. Klebsiella, Enterobacter, Proteus, and Serratia are the primary opportunistic and often nosocomial pathogens. Pseudomonas aeruginosa is an opportunistic pathogen and a major cause of hospital-acquired infections such as UTI, particularly in patients who have been subjected to catheterization, instrumentation, surgery, or renal transplantation or to prior antibiotic therapy.(28)

4 Major Advances and Discoveries

Infected children, men, and those who experience UTI relapse should be investigated with intravenous pyelography to allow detection and correction of any factor causing predisposition to infection.(29)The risk of UTI, both cystitis, and pyelonephritis, can be increased by several factors, especially sexual intercourse, particularly with a new sexual partner. Immunodeficiency and urogenital tract anatomical abnormalities have been considered the essential risk factors for recurrent UTI. In healthy women,Voiding dysfunction and behavioral factors also increase the risk of recurrent UTI.Sexual intercourse and estrogen deficiency in postmenopausal women might have the strongest association

with recurrent UTI.. Vaccines for recurrent UTI are recommended by the latest guidelines and are available on the market.(30)

Recent research has revealed many novel concepts in recurrent UTI including pathogenesis, risk factors, biomarkers, and prevention. Nowadays recurrent UTI may be considered a distinct disease and patients with recurrent UTI should be managed aggressively.

5 Ideas where the Research go Next?

Together, these mechanisms work in concert to help eradicate a UTI. In all likelihood, these mechanisms are constantly being utilized by our urinary tract to ward off invading pathogens without a single symptom or invasive infection.(31)

UTI are the some of the most common bacterial infections,resulting in billions of dollars in health care annually (32)

The only effective treatment option available-antibiotics (33,34) These are considered complicated UTIs, defined as those in the presence of factors that predispose to persistent or relapsing infection, such as foreign bodies (calculi, indwelling catheters), obstruction, renal failure, and urinary retention.(35)

Initial therapy is based on the local susceptibility patterns of *E. coli* and other uropathogens. For the treatment of cystitis, an adequate urinary antibiotic concentration is important to ensure response to therapy Nitrofurantoin is recommended for the treatment of cystitis. It is highly active against *E. coli*, with 0.9% resistance among female outpatients.Trimethoprim/sulfamethoxazole remains a highly effective agent for the treatment of uncomplicated cystitis, with cure rates of 90%–100%.Fluoroquinolones (e.g., levofloxacin or ciprofloxacin) are recommended for the treatment of uncomplicated pyelonephritis

6 Current Debate

Fosfomycin trometamol has in vitro activity against most Enterobacteriaceae spp. including ESBL-producing isolates and *Enterococcus* spp.Studies of β -lactam antibiotics (e.g., amoxicillin/clavulanate, cefaclor, cefdinir, cefpodoxime, and ceftriaxone) report lower efficacy than with fluoroquinolones and trimethoprim/sulfamethoxazole.(36) Depending on the susceptibility of isolated strains, different oral relay possibilities were available: 30% of isolates were susceptible to cotrimoxazole, 50% were susceptible to ciprofloxacin and only 37% were resistant to both antibiotics, which led to the prescription of a non-orthodox combination.(37). Thus urine culture should be performed as screening and diagnostic tool of UTI in pregnancy in this setting.(38) UTIs vary greatly by clinical presentation and therapeutic management.Urinary tract infections affect a variety of patients with different biological and procedural risk factors (e.g., age, sex, pregnancy, catheters and urologic interventions). However, not all bacteriurias require antibiotic therapy, particularly in the presence of ASB. Antibiotic stewardship practices are essential to promote judicious antibiotic use for UTIs. This can significantly reduce antibiotic resistance because UTIs are the most common infections leading to an antibiotic prescription.(39)

Foreign bodies (calculi, indwelling catheters), obstruction, renal failure, and urinary retention. (40)

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