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A Prospective Observational Study to Evaluate the Rationality in Prescription of Antibiotics in Patients with Urinary Tract Infection



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ABSTRACT

UTI is an infection of the urinary tract which is commonly seen in females. Most of the infections are caused by bacteria and antibiotics are the drugs of choice. There are several other study literatures related to urinary tract infection. Most of the studies are mere epidemiological surveys and focus on the distribution pattern of UTI. The role of pharmacist and assessment of antibiotic prescribing pattern is limited. Our study focuses on evaluating rationality in antibiotics prescribed. A prospective observational study was conducted in the department of General Medicine on 70 UTI patients prescribed with antibiotics. Hospital antibiotic policy was used to assess the rationality of antibiotics. Adherence to antibiotic policy was checked. Study concluded that the prescribing pattern of antibiotics and rationality in prescribing is fairly appropriate and still need to be improved. Unnecessary polypharmacy needs to be avoided, prescribing antibiotics with respect to culture reports need to be promoted over empirical antibiotic therapy. It is hoped that the objectives of the study are met and will result in a better usage of antibiotics for UTI with lesser incidence of antibiotic resistance.



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INTRODUCTION

A urinary tract infection can be defined as the presence of microorganisms in urine that cannot be accounted for by contamination. It can be infection in any part of your urinary system – kidney, ureter, bladder or the urethra. Most infections are in the bladder or urethra, but serious infections involve the kidney. Lower urinary tract infections are the most common type of UTI and are very common in women. The treatment is most antimicrobial agent based and needs clear evaluation.

SIGNS AND SYMPTOMS OF UTI: Urinary tract infections don't always cause signs and symptoms, but when they do, they may include: a strong, persistent urge to urinate, burning sensation when urinating (dysuria), passing frequent, small amounts of urine, urine that appears cloudy, urine that appears red, strong-smelling urine, pelvic pain, in women, mild fever, chills, feeling ill, nausea and vomiting, poor appetite.

COMPLICATIONS OF UTI: Infections, especially in women who experience two or more UTIs in a six-month period or four or more within a year, recurrent episodes of UTI, Permanent kidney damage from an acute or chronic infection, increased Recurrent risk in pregnant women of delivering low birth weight or premature infants, urethral narrowing (stricture) in men from recurrent urethritis.

TYPES OF UTI: Based on the site: Lower urinary tract infection (Urethritis, Vaginitis) and Upper urinary tract infection (Pyelonephritis). Based on the symptoms: Symptomatic UTI (signs and symptoms of UTI with laboratory tests confirming a bacteriuria of at least 1,00,000 CFU per ml) and Asymptomatic UTI (no signs and symptoms of UTI but laboratory tests confirm a bacteriuria of at least 1,00,000 CFU per ml). Based on the complication: Complicated UTI (infection of the urinary tract leading to structural and functional abnormality) and Uncomplicated UTI (a normal infection without prior surgery or instrumentation). Based on occurrence: Relapse (recurrence of bacteriuria with the same organism within 7 days of completion of antibacterial treatment), Reinfection (bacteriuria is absent after treatment for at least 14 days, followed by recurrence of infection with the same or different organism).

PATHOPHYSIOLOGY: The bacteria that cause urinary tract infections typically enter the bladder via the urethra. However, infection may also occur via the blood or lymph. It is believed that the bacteria are usually transmitted to the urethra from the bowel, with females

at greater risk due to their anatomy. After gaining entry to the bladder, *E. coli* are able to attach to the bladder wall and form a biofilm that resists the body's immune response:

Pathogenesis of urinary tract infection

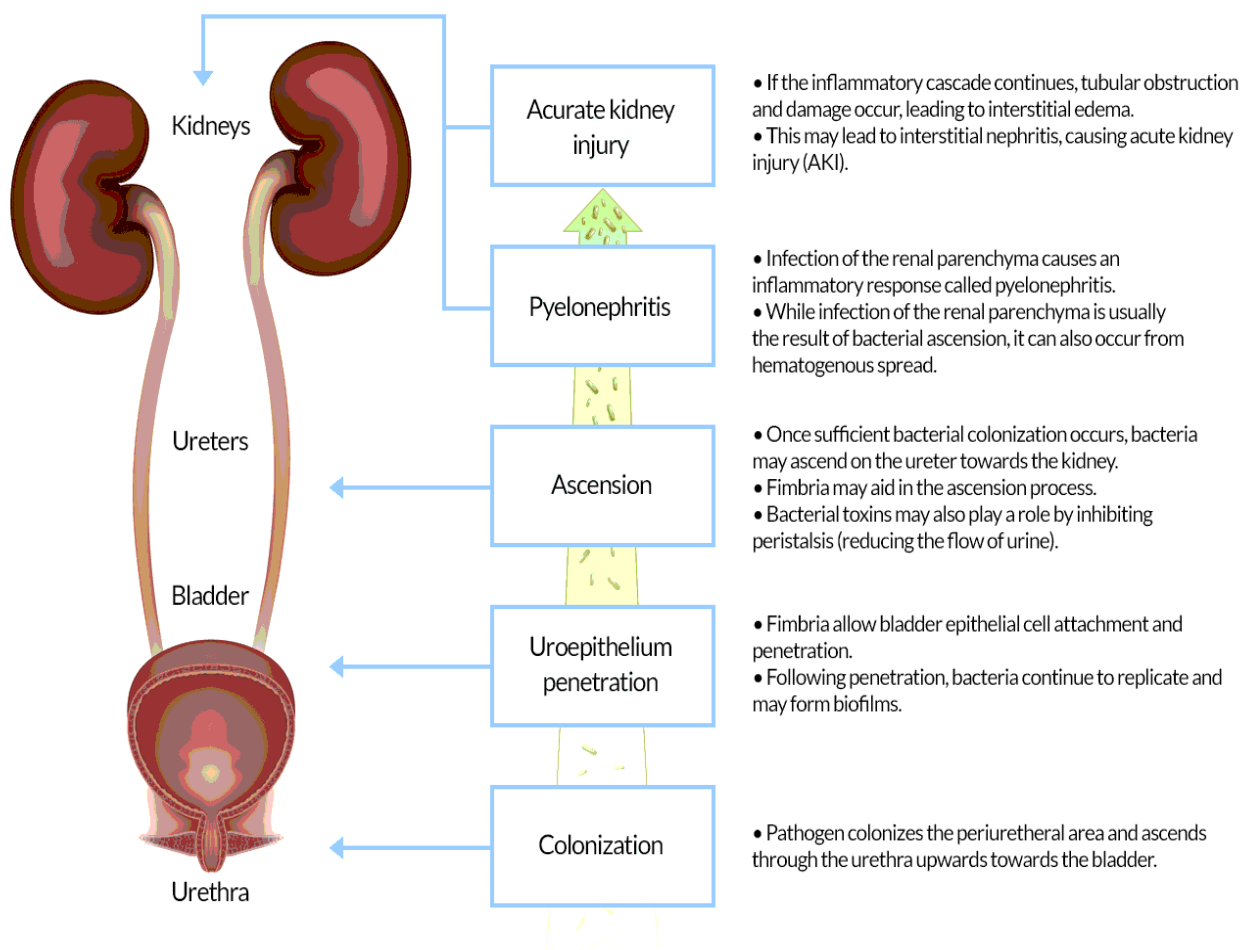


Figure No. 1: Pathogenesis of Urinary Tract Infection

ETIOLOGY: The vast majority of urinary tract infections (UTIs) are caused by the bacteria like *E. coli*, *Klebsiella pneumonia* and less by fungi like *Candida albicans*, virus like Adenovirus and other microorganisms. Urinary tract infections are common in women, and many women experience more than one infection during their lifetimes. Other risk factors include urinary tract abnormalities, blockages in the urinary tract, a suppressed immune system, catheter use, a recent urinary procedure etc.

DIAGNOSIS: Tests and procedures used to diagnose urinary tract infections include: Urine dipstick test, analyzing urine, growing urinary tract bacteria in a lab creating images of your urinary tract, using a scope to see inside your bladder.

PREVENTION OF UTI: Drink plenty of liquids, especially water, drink cranberry juice, wipe from front to back, empty your bladder soon after intercourse, avoid potentially irritating feminine products, change your birth control method.

NON-PHARMACOLOGICAL MANAGEMENT: Keep yourself hydrated, urinate when the need arises, drink cranberry juice, use probiotics, get enough vitamin C, use cucumber daily, drink diluted apple cider vinegar on empty stomach.

PHARMACOLOGICAL TREATMENT: Minor cases of UTI are self-limiting and can be treated non pharmacologically. Others require antibiotic therapy. The goals of antimicrobial therapy are: Eradicate the invading organism, choose the specific antibiotic, improve the symptoms of UTI, prevent further complications, prevent recurrence of UTI.

RATIONALITY OF PRESCRIPTION: The rational use of medicines (RUM) is defined as “patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time and the lowest cost to them and their community”. The overuse, underuse and misuse of drugs result in wastage of resources and widespread health hazards. Irrational use can happen by taking an antibiotic without a prescription, skipping doses or saving antibiotics for future use. Irrational prescription can happen by unnecessary drugs being prescribed, wrong drug or wrong dose.

MATERIALS AND METHODS

- **STUDY DESIGN:** Prospective observational study
- **STUDY SITE:** Tertiary care hospital
- **INCLUSION CRITERIA:** In-patients receiving antibiotic for UTI in the department of General Medicine, both male and female, age group 18 to 80 years, those who give consent voluntarily to participate in the study.
- **EXCLUSION CRITERIA:** Out-patients, pregnant and lactating women, patient who are not willing to give consent.

• **STUDY PROCEDURE:** A prospective observational study was conducted in the department of General Medicine on the topic ‘*A prospective observational study to evaluate the prescription pattern of antibiotics for safety, effectiveness and rationality in patients with Urinary Tract Infection*’. The selection of patients was based upon the inclusion and exclusion criteria. All patients will be given a brief introduction about the study and the confidentiality of the data. A written informed consent form will be obtained from the patient or care giver. Patients with UTI and on antibiotic were identified. The prescriptions of patients were analysed for drugs prescribed, rationality in prescription, adherence to antibiotic policy and urine culture reports. Patient demographic data, drug therapy and culture sensitivity test (if available) collected on a patient data collection form. Prescriptions of drugs were collected from the medical records and assessed using Hospital Antibiotic policy.

RESULTS AND DISCUSSION

Table No. 1: Distribution pattern of UTI patients according to the pattern of prescribing antibiotic

| PATTERN OF PRESCRIBING ANTIBIOTIC | No. of Patients |
|--|------------------------|
| Antibiotic not changed to culture report | 2 |
| Specific antibiotic to culture report | 14 |
| Empirical antibiotic therapy continued | 46 |
| Empirical changed to specific antibiotic | 8 |

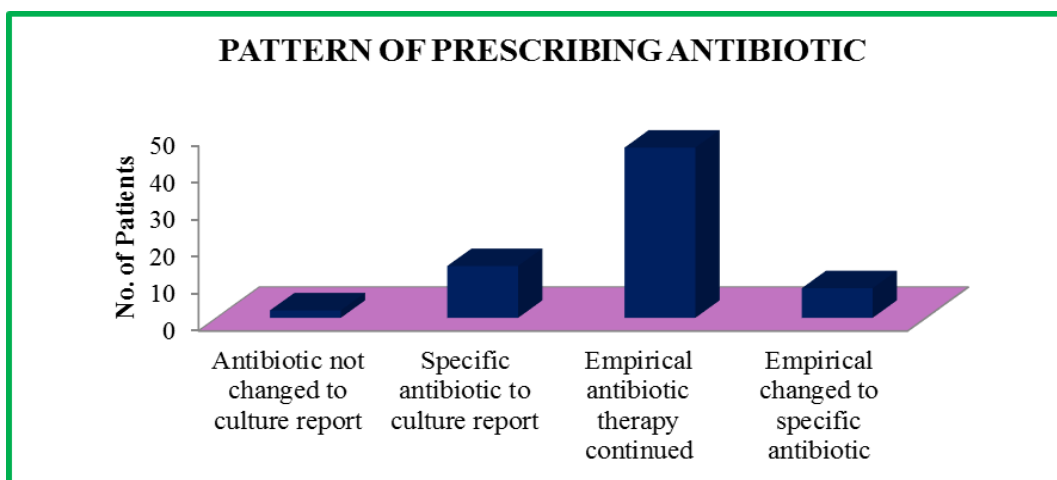


Figure No. 2: Distribution pattern of UTI patients according to the pattern of prescribing antibiotic

Rational prescription refers to prescribing of appropriate drug in doses that meets the clinical needs of patients. Most of the antibiotic treatment was empirical and not specific which may result in antibiotic resistance in future and may lead to recurrence of UTI. Majority of the patients had duration of therapy less than 10 week and was discharged on symptomatic improvement.

HOSPITAL ANTIBIOTIC POLICY

| INFECTION | COMMON BACTERIAL PATHOGEN | FIRST CHOICE | ALTERNATIVE CHOICE | DOSAGE |
|---|---|--|---------------------------|--|
| Cystitis Uncomplicated | Enterobacteriaceae E.faecalis S.saprophyticus | Nitrofurantoin for 5 days | Cotrimoxazole for 3 days | Nitrofurantoin 100mg PO, OD |
| Pyelonephritis Uncomplicated A urine culture and sensitivity test should be performed and initial empirical therapy should be tailored appropriately on the basis of infecting uropathogen. | Enterobacteriaceae | Piperacillin + Tazobactam or a 24-hour dose of Amikacin until afebrile | Cotrimoxazole for 14 days | Cotrimoxazole 160/800 DS 1 tab, PO twice daily Amikacin 15mg/kg IV, Q6H |
| Pelvic inflammatory disease (outpatient) | Chlamydia Anaerobes Facultative anaerobes | Ceftriaxone single dose + Doxycycline for 10 days PO + Metronidazole for 14 days | | Ceftriaxone 250 mg IM Doxycycline 100mg BD Metronidazole 400mg TID orally |

| INFECTION | COMMON BACTERIAL PATHOGEN | FIRST CHOICE | ALTERNATIVE CHOICE | DOSAGE |
|---|---------------------------|-------------------------|---|--|
| <p>COMPLICATED UTI</p> <p>Urine specimen for culture should be obtained prior to initiating antimicrobial therapy for presumed CA-UTI because of the wide spectrum of potentially infective organisms and the increasing likelihood of antimicrobial resistance</p> | Enterococci | Ampicillin + Gentamycin | Remove or change the catheter if sufficient | <p>Meropenem 1g IV Q8H</p> <p>Piptaz 4.5g IV Q6H</p> <p>Ampicillin 2g IV Q6H</p> |
| | Pseudomonas | Pip + Taz | | |
| | Acinobacter | Meropenem | | |
| | Candida spp | Fluconazole | | |
| | GNB | Pip + Taz | | |
| | | Duration 7/14 days | | |

CONCLUSION

UTI is a common bacterial infection affecting all population especially women. Antibiotic treatment for UTI is often empirical based on physician's comfort and experience. As the numbers of UTI patients are increasing in the current scenario this study is an attempt to evaluate the prescription pattern of antibiotics. The study was conducted in the General Medicine Department of a tertiary care hospital. 70 in-patients of the age group 18 to 80 years of all gender receiving antibiotic for urinary tract infection was chosen for the study. Prescriptions of all the patients were analyzed and data collected which was evaluated on the basis of urine culture reports and Hospital antibiotic Policy.

In a good number of cases, the antibiotics were prescribed after the culture reports or were changed as per the same. Still in majority of the prescriptions, the antibiotic prescribing was empirical and the drug was continued throughout the hospital stay as the patient improved symptomatically. Though the adherence level to the Hospital Antibiotic policy was high and

appreciable, it needs to be improved to which helps prevent future antibiotic resistance. The drug needs to be prescribed as per the causative organism which will result in better patient condition and prevent chances of recurrence.

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