

# Perception Of Clinicians Regarding Most Appropriate Antibiotic In Treatment Of Complicated Urinary Tract Infections

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## Abstract

**Objectives:** To determine the perception of the clinicians about the most appropriate antibiotic in complicated urinary tract infections (UTI) and to correlate that perception with 130 positive consecutive reports of Urine culture & sensitivity (C/S). **Methods:** It is a retrospective analytical study conducted at Department of Urology Institute of Kidney Diseases Hayatabad Peshawar from October 2007 till 30th June 2008. A total numbers of 100 clinicians were included in the study. We included the clinicians who are involved in the management of UTIs, e.g. Physicians, Surgeons, Pediatricians and Gynecologists. The final positive reports of 130 urine C/S were collected from department of Pathology, amongst which 70 samples were hospital acquired UTI and 60 sample were community acquired UTI. The data was recorded on structured proforma and was analyzed on SPSS version 10. Pearson coefficient value was applied to test the significance of correlation. **Results:** 54 clinicians preferred ciprofloxacin as the most appropriate and least resistant antibiotic in complicated UTI. Microbiologically, the gram-negative rod E-Coli was the most frequently encountered microorganism in 54 (77%) in hospital acquired complicated UTI and it was responsible in 49 (83 %) cases in community acquired UTI. Regarding the resistance, Ciprofloxacin was found resistant in 26 cases (37%) in hospital acquired and 18 (30%) in community acquired UTI, that indicates that perception of clinicians is wrong in selecting ciprofloxacin ( $p < 0.005$ ). The injectable antimicrobial like amikacin and cefoperazone plus sulbactam had an excellent coverage for the majority of uropathogens in complicated UTI. **Conclusion:** UTI is most common bacterial infection of human being. The emerging antimicrobial resistance in UTI is a major health problem of 21<sup>st</sup> century. The perception of clinician that ciprofloxacin is most appropriate and least resistant drug in complicated UTI is wrong ( $p < .005$ ).

## INTRODUCTION

Urinary tract infection (UTI) is the most common disease in the urology clinics across the globe, and still it bears significant morbidity and even mortality in modern medicine. The overall incidence of UTI is approximately 12.3% with the female to male predominance of 2:1. Approximately 15-20% of all females will acquire UTI at some stage of their lives<sup>1</sup>. It has also been estimated that bacteriuria increases 1% with each decade. It is 15-20% in post menopausal women as compared to male with the rate of only 5 percent. The causative agents in 90% of the cases are Gram Negative Rods. Amongst them it is the E-Coli that is responsible for the UTI in 80% of UTI. The Etiology is influenced by factors such as age, diabetes, spinal cord injury, urinary catheterization, and other factors<sup>2,3</sup>.

There are several pharmacological antimicrobial therapies available for the treatment of UTI, but unfortunately there

has been no guideline for the management of UTI that answers the optimum duration of treatment, the appropriate antibiotics, and the use of antimicrobials in special cases like paediatric age group, pregnancy, lactation and patients with renal or hepatic impairment<sup>4</sup>.

The increasing prevalence of infections caused by antibiotic-resistant bacteria makes the empirical treatment of UTIs more difficult. One of the important factors contributing to these high resistance rates might be high antibiotic usage. Urine culture and antimicrobial susceptibility testing are essential for patients with UTI, who have risk factors for resistance.<sup>4,5</sup>

The perception of selecting the most appropriate antibiotic in UTI is different from clinician to clinician. The majority of clinician still presumes that Fluoroquinolones are the most sensitive drug in the management of UTI, but there is no

clinical accreditation of their belief, as so far no local data is available to address the growing resistance of antimicrobials to uropathogens.

The present study is conducted to determine the perception of clinicians regarding the most appropriate antibiotic in UTI.

## MATERIAL & METHODS

The objective of our study is to determine the perception of the clinicians about the most appropriate antibiotic in complicated urinary tract infections (UTI) and to correlate that perception with 130 positive consecutive reports of urine culture & sensitivity (C/S). It is retrospective analytical study, conducted in Department of Urology at Institute of Kidney Diseases Hayatabad Peshawar from October 2007 till 30th June 2008. Total numbers of

100 clinicians were included in the study. We included 25 each physicians, surgeons, pediatricians and gynecologists who are involved in management of UTI. The final positive reports of 130 Urine C/S was collected from Department of Pathology, Hayatabad Medical Complex Peshawar. Data was collected on structured proforma and was analyzed on SPSS version 10. Pearson Coefficient value was applied to test the significance of correlation. There is no conflict of interest in present study.

## RESULTS

A total number of 100 clinicians participated in the study. We included 25 each from physicians, surgeon, pediatricians and gynecologists. The over all preferences of the clinician about most appropriate and least resistant antibiotic in complicated UTI has been shown in Table 1

**Figure 1**

Table 1: Showing the relative distribution about most preferred antibiotics

n=100		
Antibiotic	Frequency	Percentage
Ciprofloxacin	54	54%
Levofloxacin	15	15 %
Cefixime	6	06%
Co-Amoxaclave	7	07%
(Cefoperazone Plus Sulbactam)	5	05 %
Amikacin	10	10%
Norfloxacin	3	03 %

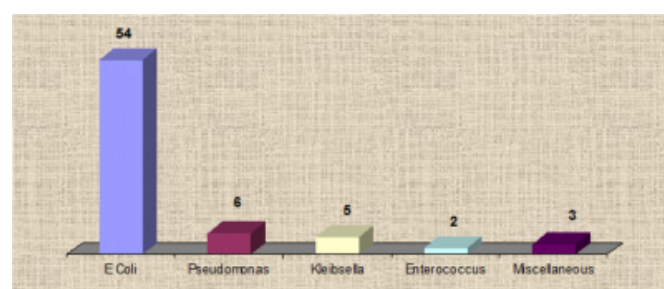
The data of 130 positive urine C/S was collected from Pathology department Hayatabad Medical complex Peshawar. 70 urine samples were obtained from patients

with hospital acquired UTI while 60 samples were obtained from patients with community acquired UTI. The microbiology of the urine culture revealed the predominance of gram negative rods especially E-Coli which was found responsible in 77% of the cases.

The relative distribution of microorganisms have been shown in figure 1

**Figure 2**

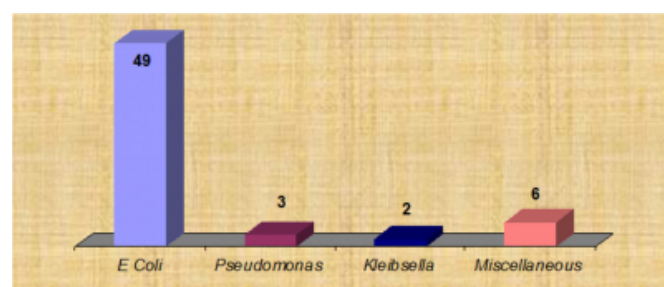
Fig 1: Bar Graph showing the causative microorganism in 70 Urine Cultures with hospital acquired UTI



Out of 130 C/S reports, 60 samples were obtained from patients with community acquired UTI. The microbiology remained almost same as hospital acquired UTI. However detailed report is shown in figure 2.

**Figure 5**

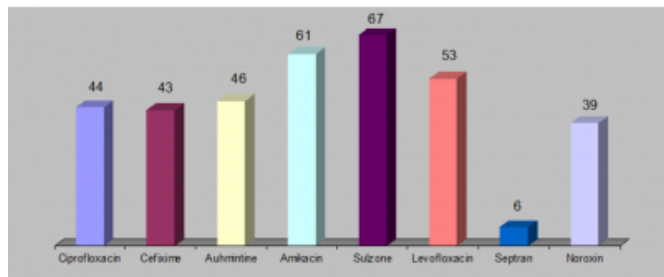
Figure 2: Showing the relative sensitivity of different antibiotics in UTI



The sensitivity for antibiotics were also assessed and studied. The sensitivity reports revealed that none of the oral antibiotics succeeded in getting the 80% sensitivity. The detail of the sensitivity of the antibiotics which were preferred by clinicians are shown in Fig 3

**Figure 4**

Figure 3: Graph showing sensitivity of different antibiotics in 70 cases of hospital acquired complicated UTI



{image:5}

When we correlate the clinician's perception with resistance pattern, we found that perception of clinicians is wrong ( $p < 0.005$ ) that ciprofloxacin is the least resistant drug for treating UTI. It was proposed by 53 % of clinicians but it was found resistant in 37 % of urine C/S reports.

## DISCUSSION

Urinary tract infection (UTI) is among the most commonly diagnosed bacterial infections in humans. Although frequently encountered and well researched, diagnosis and management of UTI continue to be a controversial issue with many challenges for the clinicians<sup>3</sup>. The understanding of the microbial origin of infectious diseases and the introduction of antimicrobial therapy stimulated more advances in the management of urinary tract infections (UTIs) in the 20th century than had occurred in the previous 5 centuries.<sup>6</sup>

The strength of our study is that it is in fact the first study on this important aspect of UTI that encompasses the perception of the clinicians and its co-relation with the urine culture and sensitivity. More over the present study has been designed with a hope to be the first step for formulating some guide lines for the management of UTI. The weakness of our study is that it is not a randomized control trail and we were not able to check the in vitro efficacy of different antimicrobial in un-complicated UTI.

The most profound advance in UTI management during the 20th century was the discovery of antimicrobial agents. Nitrofurantoin was the first truly effective and safe antimicrobial therapy for UTI but its spectrum of activity is limited. Broad use of amoxicillin (and other beta-lactams) after its introduction in the 1970s led to the development of resistance to this antimicrobial, prompting a gradual change

to trimethoprim/sulfamethoxazole (TMP/SMX) as the first line therapy for UTI. However, wide use of TMP/SMX also resulted in the progressive emergence of resistance, limiting the clinical usefulness of this therapy in the modern management of UTI<sup>6</sup>.

Fluoroquinolones offer an attractive alternative to TMP/SMX, and American and European guidelines recommend their empirical use in areas where TMP/SMX resistance is 10% or higher.<sup>5,7</sup>

The present study indicates that most of the clinician in present setting prefers Fluoroquinolones which is in accordance with the international literature. The earlier report of sensitivity for the Quinolones was very encouraging in uncomplicated as well as complicated UTI reaching almost 95 %. But the current data in the world suggests that probably the over use of Ciprofloxacin has led to the emergence of resistance. The rates of Fluoroquinolones-resistant resistant E.Coli isolates increased rapidly from 1998 climbing up to 30-40%. These results are comparable with the present study where the resistance for the Ciprofloxacin was 37% in complicated UTI.<sup>7,8,9</sup> It is indeed a matter of great worry that the sensitivity of majority of the other oral antibiotics is less than 80% with the same microbiology that is dominated by gram negative rods especially the E-Coli. This change of evolving antimicrobial resistance has also been described in current literature.<sup>10,11,12</sup>

The Injectable Cefoperazone plus Sulbactam and Amikacin provided the widest coverage amongst all the antibiotics tested in the present study. Our this findings were duly endorsed by two recently conducted larger trials by Fluit AC and colleagues from University Hospital Utrecht, The Netherlands and Sweih N, Jamal W from Department of Microbiology, Faculty of Medicine, Kuwait University, Kuwait<sup>5,7</sup>.

There have been so many advances in the recent literature about establishing Antimicrobial Surveillance Program to monitor the occurrence and antimicrobial susceptibility of bacterial pathogens via an international network of sentinel hospitals.<sup>7,10</sup> The mutant-prevention concentration (MPC) has raised as a novel susceptibility parameter designed to minimize the selection of first-step resistant mutants present in large,  $\geq$  or equal to 10 (10) CFU/ml, heterogeneous bacterial populations and is a distinct measurement from minimum inhibitory concentration testing.

Such parameters are also desired in our set up to put a break to the rapidly growing resistance for the antimicrobials in complicated UTI.

## CONCLUSIONS

Urinary tract infections are most common bacterial infections of human being. It is very unfortunate that, there are no guidelines for the management of UTI as compared to developed world. The resistance for antibiotics is emerging as greater health problem of 21<sup>st</sup> century. The perception of most of clinicians that ciprofloxacin is least resistant drug in UTI proved to be wrong ( $p < 0.005$ ).

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