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Full Length Research Article

Prulifloxacin versus other quinolones for the treatment of Urinary Tract Infections

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Prulifloxacin, a fluoroquinolone antimicrobial agent which is a prodrug of ulifloxacin, has broad spectrum activity against gram positive and gram negative bacteria. In recent years it has been used efficaciously for the treatment of community acquired and nosocomial infections like urinary tract infections. The present study was aimed to compare the antimicrobial activity of prulifloxacin with other fluoroquinolones against urinary pathogens. The study was done of eighty urinary E. coli isolates. The result of this study indicates no significant difference in the antimicrobial activity was seen. The prolonged and high urinary concentration following a single oral dose strongly supports use of prulifloxacin for the treatment of urinary tract infections.

Key words: Prulifloxacin, Quinolones, Urinary Tract Infection, Antibiotic, Treatments

INTRODUCTION

Urinary tract infection (UTI) is a frequent problem which accounts for several OPD visits and significant hospitalizations.[1] It is predominantly a bacterial infection occurring in both community and health care settings. It is a kind of infection which is prevalent in all age groups from the pediatric to the geriatric group. Many different microorganisms can cause UTIs though the most common pathogens are E. coli and members of family Enterobacteriaceae, which accounts for approximately 75% of the isolates.[2] There are sufficient treatment options available for these UTIs and the flouroquinolones have been used frequently for their treatment.[3,4] Over the years several analysis of the fluoroquinolone class of antibiotics has entered into different stages of clinical development.

Antibiotics are usually prescribed empirically before the laboratory results of urine culture are available, which necessitate to have details information regarding bacterial spectrum, antimicrobial susceptibility of uropathogens, whether the infection is complicated or uncomplicated and the adverse effects of the drugs. Since the susceptibility pattern is not constant and also varies among hospitals, the present study was planned to compare the antimicrobial susceptibilities of E. coli urinary isolates against Prulifloxacin in comparison to the other members of fluoroquinolones which include nalidixic acid, ofloxacin, levofloxacin, ciprofloxacin, lomifloxacin and prulifloxacin. Prulifloxacin is an oral fluoroquinolone specifically a lipophilic prodrug of ulifloxacin which has got broad spectrum antimicrobial activity against both gram positive and gram negative bacteria.[5] It has been approved for the treatment of complicated and uncomplicated lower urinary tract infections, acute exacerbation of chronic bronchitis and acute bacterial rhinosinusitis.[6]

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MATERIALS AND METHODS

Samples

This was a retrospective study with an observation period of eighteen months (May 2012 to October 2013) during which all the urine samples received in the department of Microbiology of Dr. Harvansh Sigh Judge Institute of Dental Sciences & Hospital were screened for the presence of any bacteria or fungi. During this period a total of 259 urine samples were screened. Qualitative urine cultures were performed in CLED agar plates. Plates were incubated at 37^0C for 18-24 h. Identification of the bacterial isolates was done using conventional biochemical methods.[7]

Antibiotic susceptibility testing

The antibiotic susceptibility testing was done for all the E. coli isolates by disk diffusion method. The antibiotics tested were amoxicillin, nitrofurantoin, ciprofloxacin, augmentin, amikacin, ceftazidime, cefotaxime, imepenem and sulbactam which are being tested in routine and were also tested for nalidixic acid, norflox, lomifloxacin, ofloxacin, leuvofloxacin and prulifloxacin. The Clinical and Laboratory Standard Institute (CLSI) criterion was used for the interpretation of the antimicrobial susceptibility.[8]

RESULT AND DISCUSSION

Of all the samples received in microbiology department during the study period of eighteen months, 30.8% (80) turned out to be *E. coli* The susceptibility pattern of the eighty E. coli isolates tested for various antibiotics is described in figure 1.Out of eighty E. coli isolates fifteen (18.75%) were sensitive

Figure:1 Antibiotic susceptibility profile of E. coli isolates from urine

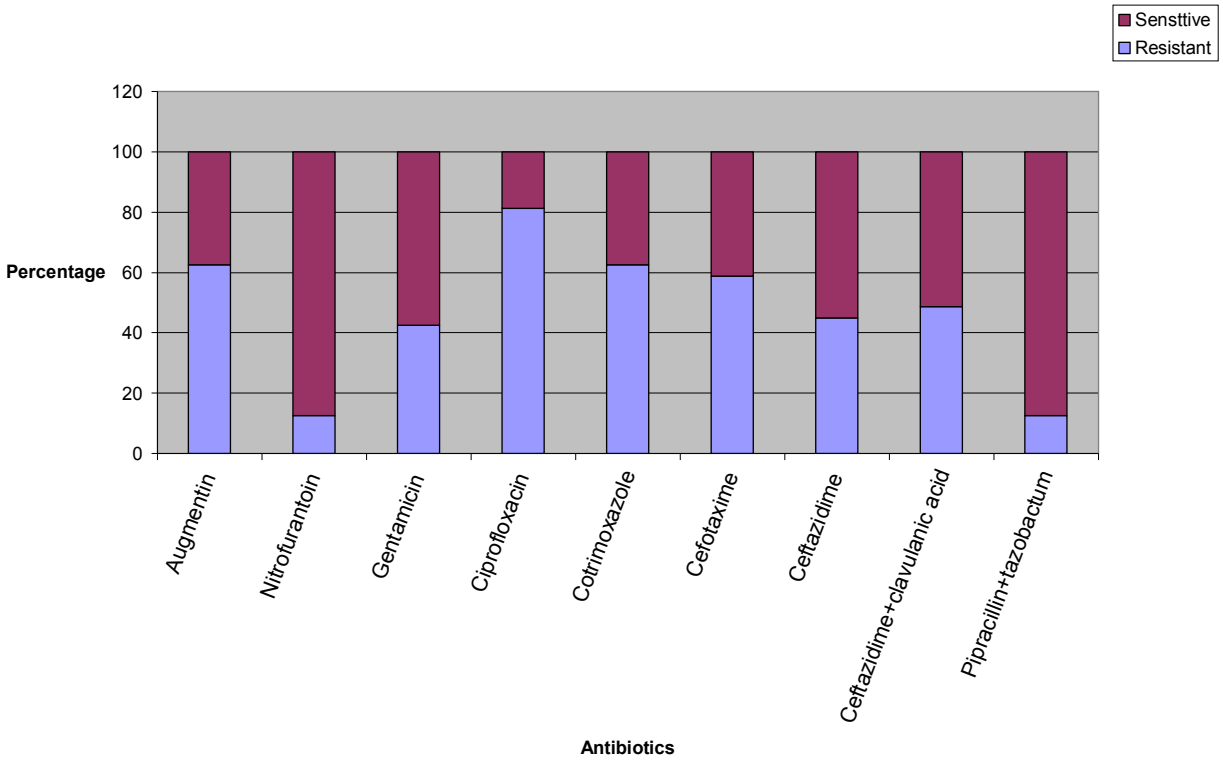
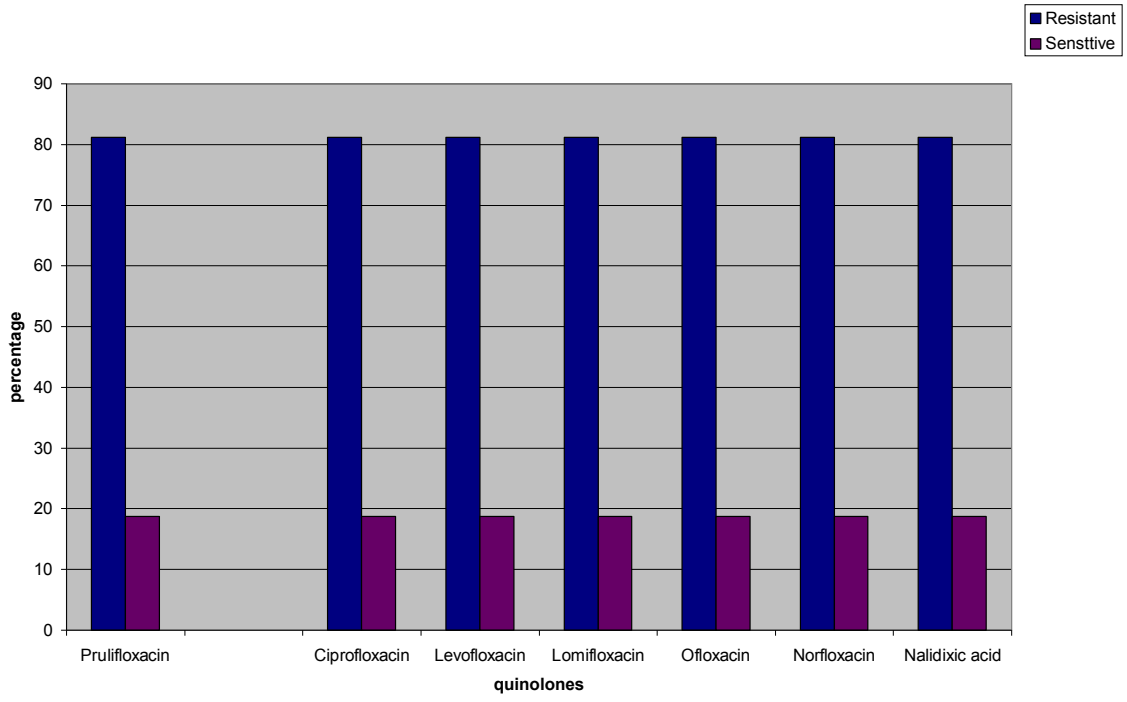


Figure 2: Antibitic susceptibility result of quinolones



to prulifloxacin whereas number of isolates that were resistant to prulifloxacin were 65(81.75%). If we look at the susceptibility of the E. coli isolates towards fluoroquinolones, this study showed that the different members of floroquinolones showed similar behavior (Figure 2). The finding is supported by another study by Carmignani et al [9] who reported that there was no statistical significant difference in the clinical and microbiological parameters of prulifloxacin and ciprofloxacin. Other studies [10,11] have shown that the ulifloxacin MICs and minimum bactericidal concentrations tend to be equal or even lower compared with ciprofloxacin, while they are generally lower compared with levofloxacin, for most gram-negative pathogens including *P. aeruginosa.* A study by Karajegopoutes[12] detected a small difference in the antimicrobial potency of the tested fluoroquinolone using standard methodology. However they also explained that such small difference might necessarily translate into clinical effectiveness and so the selection of the most appropriate

treatment can not solely rely on antimicrobial potency data. Other pharmacokinetic and pharmacodynamic properties of the antimicrobial agents should also be considered in this regard. Another study by Noviello et al[13] concluded that the in vitro activity of prulifloxacin appears to be similar or slightly greater than ciprofloxacin and levofloxacin against both Gram positive and Gram negative bacteria. Gualco et al.[14] reported that ciprofloxacin and prulifloxacin showed same MIC_{50} values.

Conclusion

The in vitro activity of prulifloxacin against urinary pathogens and its high and prolonged urinary concentration following a single oral dose, suggest that prulifloxacin is an alternative to other fluoroquinolones for the treatment of urinary tract infections. The broad spectrum antimicrobial activity of prulifloxacin allows its use in the empiric therapy of UTIs. Additional research is needed to further elucidate the promising role of prulifloxacin in the treatment of infections sustained by multi-drug resistant pathogens and to consolidate the wide spectrum of activity from a clinical standpoint.

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