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A Study on Ciprofloxacin Resistance among E. coli Strains Isolated from Various Samples in Tertiary Care Hospital

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Original Research Article

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Abstract: Escherichia Coli is one of the most frequent organisms isolated in microbiology lab. It is responsible for causing urinary tract infection, gastrointestinal infections, pneumonia, cellulitis, diabetic foot and etc. Fluroquinolones are one of the commonly prescribed antibiotics for treatment of Urinary tract infection. Inappropriate and misuse of antibiotic possess a greater threat to society with its emerging resistance. In this study a total of 80 E.Coli isolates were isolated from various clinical samples from patients and subjected for antibiotic susceptibility testing. Among 80 isolates, 47 were resistant to ciprofloxacin. Ciprofloxacin resistant isolates were highly susceptible to nitrofurantoin, followed by carbapenems, amikacin, cephalosporins, gentamicin.
Keywords: ciprofloxacin, drug resistance, E.coli, fluroquinolones, antibiotic sensitivity.

INTRODUCTION

The extensive emergence of resistance to commonly used antibiotics like fluroquinolones for treating various common ailments like UTI, diarrohea, cellulitis has posed a great challenge to physicians. Widespread resistance to fluroquinolones among the E.coli isolates has been recognized since mid-1990 s. Ciprofloxacin showed a consistent increase in the trend of resistance pattern among E.Coli isolates since 1995-2001(0.7%-2.5%)[1]. Fluroquinolone resistance is mainly due to diminished uptake of drug, activation of efflux pump which removes quinolones before sufficient intracellular concentration to inhibit DNA metabolism are achieved, and by altering target enzyme DNA gyrase subunit [2].

Fluroquinolone is one among antibiotic group that act mainly on enzymes DNA gyrase and topoisomerase IV which is responsible for bacterial viability. Fluroquinolone resistance mainly depends on three factors its ability to act on mutant bacteria generated during previous antibiotic exposure, ability to select resistant mutants, the ability to reach concentrations that are able to avoid resistance selection [3].

Nowadays due to the increasing therapeutic failure with empirical treatment, it is important to find out antibiotic susceptibility and resistance pattern through invitro antibiotic sensitivity test [4].This study was done to find out the resistance pattern of Ciprofloxacin to E.coli strains isolated from various clinical samples in a tertiary care hospital.

MATERIALS AND METHODS

The study was carried out in Microbiology department ,at Sree Balaji Medical College And Hospital, Chennai over a duration of three months from June 2017 to August 2017.Total no. of samples were 280, samples received were (urine, wound exudates, blood)in the laboratory. All these samples were routinely subjected to culture on nutrient agar, blood agar, Mac-conkey agar and incubated at 37 deg C overnight, standard biochemical test was done to confirm E.coli isolates [5, 6]. The antibiotic sensitivity test was done by Kirby-Bauer disc diffusion method on Muller Hinton Agar with commercially available disc nitrofurantoin (300mcg), gentamicin (10mcg), amikacin (30mcg), ciprofloxacin (5mcg), cotrimoxazole (1.25/23.75mcg), ceftazidime (30mcg), ceftriaxone (30mcg), cefotaxime (30mcg), piperacillin tazobactam (100/10mcg), amoxyclav 20/10 (30mcg), meropenem

(10mcg), imipenem(10 mcg). Results were interpreted according to CLSI guidelines. We observed resistance pattern of E. Coli isolates to Ciprofloxacin and we also compared sensitivity and resistance pattern of ciprofloxacin to other antibiotics like amikacin, cephalosporin, nitrofurantoin, carbapenems, and gentamicin.

RESULTS

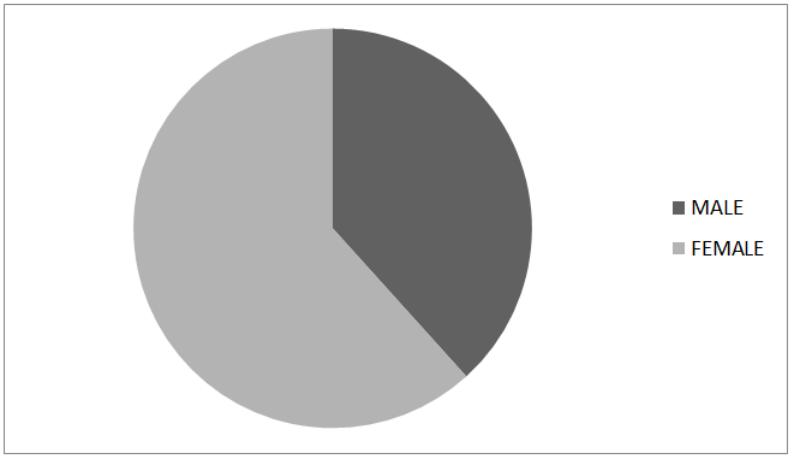

Fig-1: Total no. of samples was 280.Out of these Male were 136, Female were 144

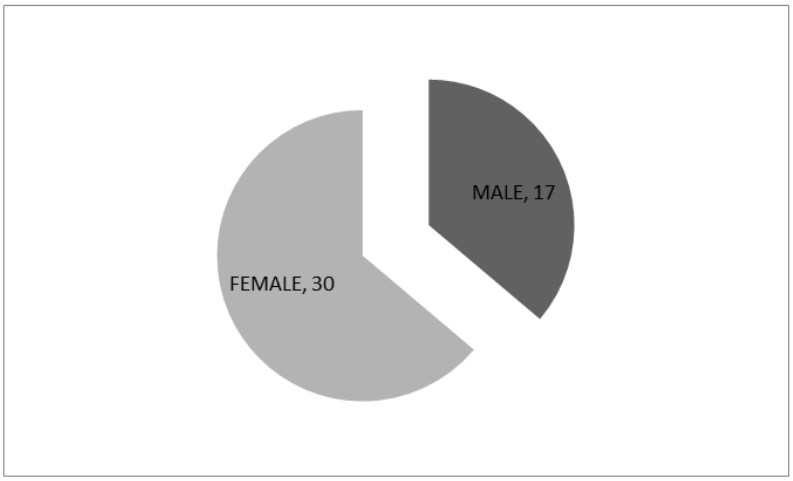

Fig-2: Among these E.Coli isolates which are Ciprofloxacin resistant, Males were 17, and Females were 30

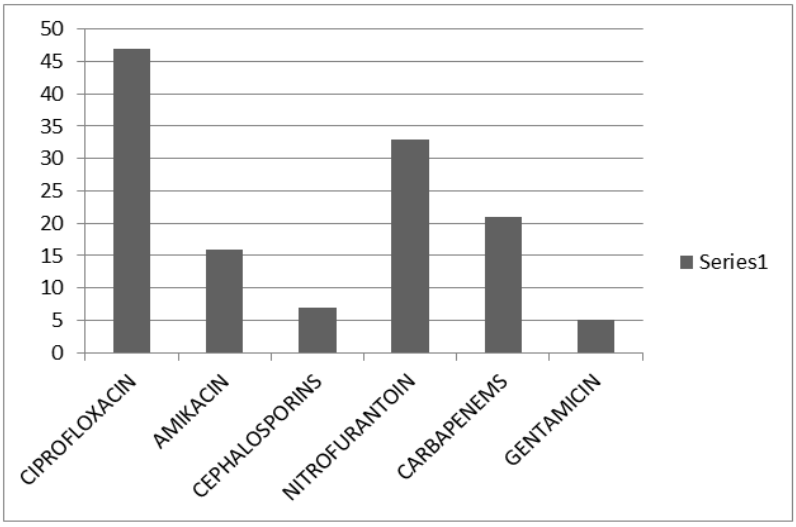

Fig-3: Comparison of ciprofloxacin resistance with other antibiotics sensitivity

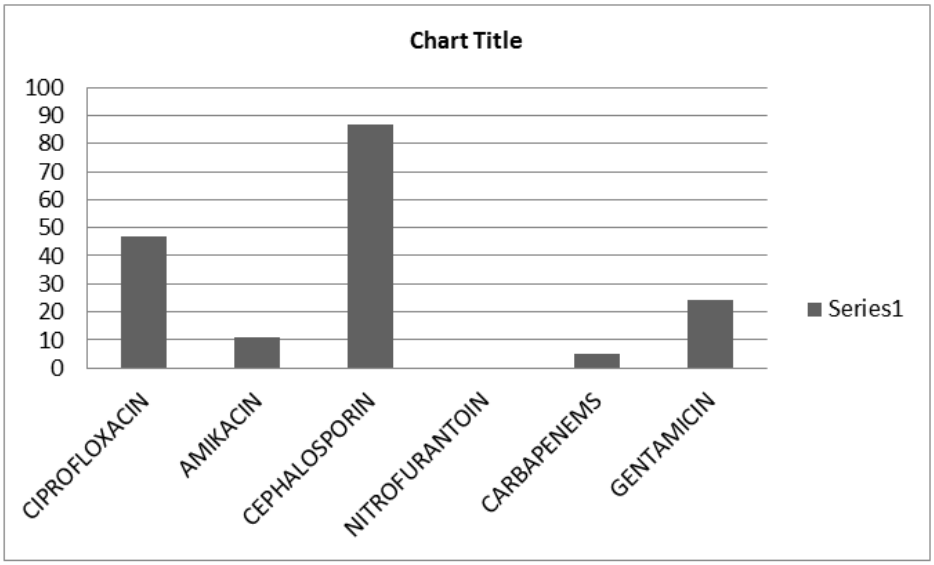

Fig-4: Comparison of ciprofloxacin resistance with other antibiotics resistance

DISCUSSION

Nowadays due to inappropriate and misuse of antibiotic usage, there is emerging bacterial resistance. In this study we evaluated the antimicrobial susceptibility pattern of ciprofloxacin to E.Coli isolates; also we compared the resistance pattern of ciprofloxacin to other antibiotics susceptibility as well as resistance. Early usage of effective bactericidal drugs has reduced the mortality to a greater extent. Because of indiscriminate usage of antibiotics have paved the development of antibiotic resistance to E.coli [7].

In this study a total of 280 samples were collected, 136 were male, 144 were female, among these 80 (28.5%) were E.Coli strains. In that 80 isolates we found 47(58.7%) isolates of E. coli were resistant to ciprofloxacin. This study revealed that these Ciprofloxacin resistant isolates were highly susceptible to nitrofurantoin, followed by carbapenems, amikacin, cephalosporins, gentamicin and also these ciprofloxacin resistant isolates were highly resistant to cephalosporins, gentamicin, amikacin carbapenems, etc. We also showed that ciprofloxacin resistant isolates were mostly female. Bacterial resistance has become a global threat and very challenging to physicians. Therefore the empirical treatment of bacterial infections with these antibiotics has to be avoided. Prescription of ciprofloxacin should be given only to sensitive cases, since very common gram negative organism like E. Coli started showing resistance to commonly prescribed antibiotic like ciprofloxacin. A strong correlation always exists between prior ciprofloxacin usage and development of resistance [8]. Hence **i**t is also the responsibility of the clinician to identify the risk factors for the development of resistance [9].Judicious usage of antibiotics can prevent emergence of drug resistance.

CONCLUSION

By promoting awareness and health education among public we can avoid the indiscriminate usage of antibiotics. Thus usage of ciprofloxacin should be only after the antibiotic sensitivity testing is done because even commonly prescribed ciprofloxacin showed resistance to E.Coli isolates. By following the rationale use of antimicrobial policy drug resistance can be prevented.

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