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FLUOROQUINOLONES: A BYGONE ERA? ANTIBIOGRAM OF VARIOUS BACTERIAL INFECTIONS IN A TERTIARY CARE HOSPITAL IN MALWA, CENTRAL INDIA

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Abstract

Background: Ready availability of antibiotics over the counter poses a significant challenge to the Indian physicians. In our research paper we have compiled the data from various samples, grouped them according to sites and the bugs

Objective: To find out the commonest bug affecting the site of infection and the sensitivity pattern of the microbes to commonly used "empiric" antibiotics

Methods: Samples were collected from inpatients of Index medical hospital at the time of admission, if referred from other primary health care or after 3days of empirical therapy for all critical ill patients. Then grouped according to specimen sites like urine, pus, stool, blood, miscellaneous and further subgrouped according to the organisms found in these samples after culture.

Result: Total 500 samples were sent of which 242 positive samples were included in the study rest were either as no organisms grown or sensitive to other group of antibiotics. The Gram negatives were predominant (62%). Majority of the isolates were from urine, pus, blood and sputum accounting for 106, 74, 31 and 31 samples respectively. In urine isolates, major organism was E.coli with 24% sensitivity to fluoroquinolones. Klebsiella pneumoniae was the predominant isolate in pus and sputum samples with 35% and 9% sensitivity to fluoroquinolones respectively. In blood samples, major organism isolated was coagulase negative staphylococcus with 27% sensitivity to fluoroquinolones.

Conclusion: The present study revealed an alarming situation that we are losing a broad spectrum antibiotic like flouroquinolone, and emphasizes the need for regular monitoring of antibiotic resistance pattern among the bacterial isolates obtained from various infections in patients awailing our facility.

Introduction

The indiscriminate use of antibiotics against the standard protocols poses a great challenge for physicians of our country while treating patients with serious life threatening infections. Although the etiology is multifactorial, it has culminated into multiple antibiotic resistance leading to increased morbidity and mortality in the patients along with the expenses without any desired results. Hence by, may have some adverse effects on some vital organs. Flouroquinolones are a class of broad spectrum, bactericidal antibiotics widely used to treat or prevent gram negatives and gram positive bacterial infections. Looking at the rapid spread of antibiotic resistance and increasing prevalence of MDR pathogens not only in hospital acquired infections but community as well, the present study was undertaken with the aim to evaluate and assess whether the flouroquinolones era is bygone.

AIM

Our study aimed to evaluate the data on antibiotic resistance focusing on flouroquinolones among isolates from various bacterial infections that are prevalent in our tertiary care hospital.

Objectives:

1. To study the prevalence of gram positive and gram negative in various clinical samples.
2. To determine the most common bacteria isolated from the clinical samples.
3. To evaluate the antibiotic sensitivity pattern of common bacterial isolates focusing on fluroquinolones for better management.

Materials and Methods:

After obtaining the permission of ethical committee of Hospital. Patients included both genders with age above 18 years. The present study was conducted in the department of Internal medicine at Index medical college and hospital, Indore. It is a retrospective analysis of data related to culture and sensitivity reports received from microbiology laboratory for a period of 12 months from 1 august 2020 to 31st July 2021. The types of clinical samples included in

the study are urine, pus, blood and sputum etc received from patients admitted in medicine department including ICU for various infections including UTI, LRTI, blood stream infection and pyogenic infections. The AST(antibiotic sensitivity test was performed using disc diffusion method. The antibiotics tested are based on CLSI guidelines 2018 and 2019 including the commonly prescribed antibiotics to patients visiting our hospital and received treatment for various infections including UTI, LRTI, etc. The data. Is analysed using descriptive statistics.

EXCLUSION CRITERIA- Patients below 18 years suffering from HIV, MDR TB AND CANCER PATIENTS.

INCLUSION CRITERIA- AGE ABOVE 18 YEARS, BOTH GENDERS

Results:

TABLE 1: ORGANISM ISOLATED IN URINE

Organism	Sample(no.)	Isolates (no.)	Sensitivity (%)
E.coli	33	8	24
P.aeruginoa	7	2	28
Klebsiella	28	12	42
S.aureus	12	0	0
CONS	17	6	35
MRSA	2	0	0
Total	99	28	

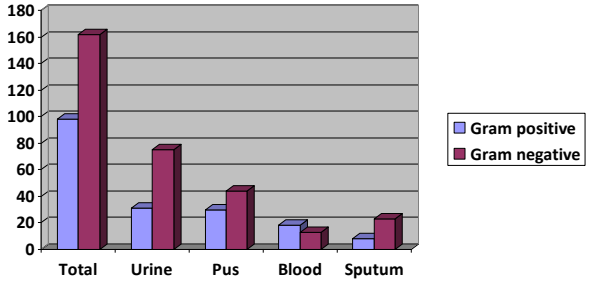


TABLE 02: PUS SAMPLE DISTRIBUTION WITH SENSITIVITY TO FLUROQUINOLONES

ORGANISM	SAMPLES	SAMPLES POSITIVE	SENSITIVITY
E.coli	10	1	10
Klebsiella	13	3	23
Pseudomonas	17	6	35
S.aureus	24	8	33
MRSA	3	0	0
CONS	3	3	1

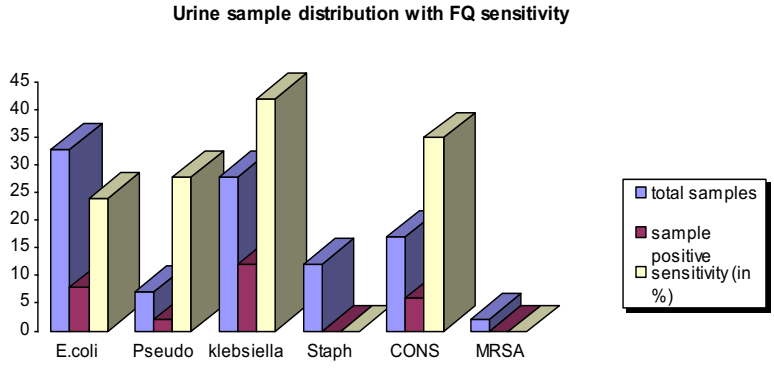


TABLE 03: Blood sample distribution with FLUROQUINOLONES sensitivity

Organism	Sample	Positive sample	Sensitivity (IN %)
Klebsiella	5	3	60
Citrobacter freundii	4	4	100
Pseudomonas	3	3	100
E.coli	1	1	100
S .aureus	5	3	60
MRSA	2	1	50
CONS	11	3	27

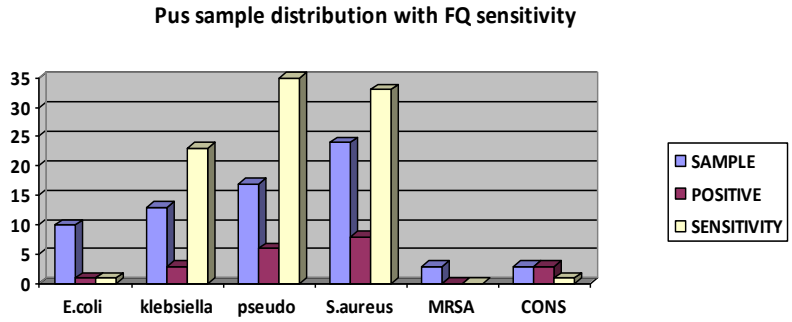
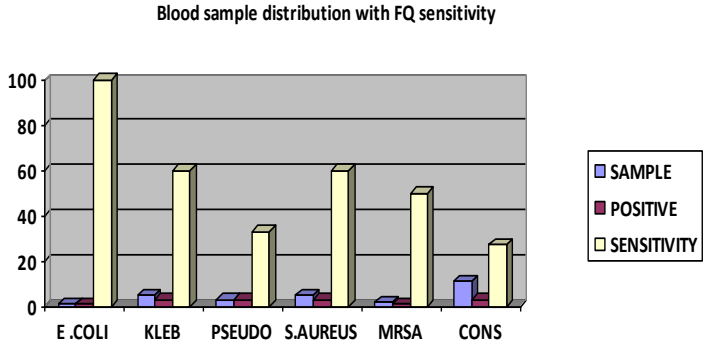
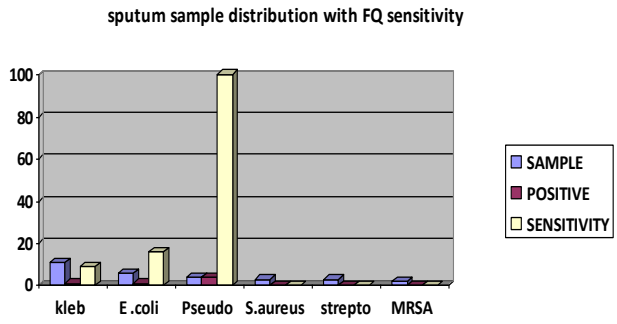


TABLE 04: Sputum sample distribution with FLUROQUINOLONES sensitivity

Organism	Sample	Positive	Sensitivity(in%)
Klebsiella	11	1	9
E .coli	6	1	16
Pseudo	4	4	100
S .aureus	3	0	0
Streptococcus	3	0	0
MRSA	2	0	0





Results:

In our study, we have analyzed 242 isolates, out of which 155 (64%) were gram negative and 87 (36%) were gram positive.

Out of 106 urinary pathogens, 75 (70.7%) were gram negative and 31 (29.2%) were gram positive organisms. The predominant gram negative pathogens were E. Coli with 33 (31.1%) isolates followed by Klebsiella species 28 (26.4%) isolates and Pseudomonas aeruginosa having 7 (0.66%) isolates with fluoroquinolone sensitivity of 24%, 42% and 28% respectively.

Coagulase negative staphylococci and Staph aureus were the most common gram positive organisms in urine with 17 (16%) and 12 (11.3%) isolates respectively. 65 % isolates of CONS were resistant to fluroquiolones. None of the isolates of S.aureus were sensitive to fluoroquinolones.

Out of the 74 bacterial pyogenic isolates, 44 isolates (59%) were gram negative and the rest were gram positive. Out of the gram negative cohort, the major pathogens were Pseudomonas aeuginosa (23 %) showing 35% sensitivity followed Klebsiella pneumonia (17.5%) showing 23% and E.coli (13.5%) with the least sensitivity of 10%.

Staphylococcus aureus was the most common gram positive pathogen obtained from 30 isolates having pyogenic infections with only 33% sensitivity to fluoroquinolones.

Discussion

The emergence of antimicrobial resistance and increasing prevalence of MDR pathogens is of great concern for clinicians. It increases the cost of the treatment , hospital stay and at times results into treatment failure. Regular monitoring of bacteriological profile with their antimicrobial susceptibility pattern in any setting is essential. In the recent study , it varies from hospital to hospital in the same region.

Out of 242 bacterial isolates obtained, 155(64%) were gram negative and 87 (36%) were gram positive.

Although our finding is in discordant with the study with Rajendram Surpam et al, who found preponderance of gram positive isolates in their study, several studies have reported gram negative isolates more common than gram positive. (R1-10,12,13,14)

Rugira Trojan et al, also reported dominance of gram negative bacteria from pus samples in their study. Out of 106 urinary pathogens, 75 (70.7%) were gram negative and 31 (29.2%) were gram positive organisms. The predominant gram negative pathogens were E. Coli with 33 (31.1%) isolates followed by Klebsiella species 28 (26.4%) isolates and Pseudomonas aeruginosa having 7 (0.66%) isolates with fluoroquinolone sensitivity of 24%, 42% and 28% respectively.

Similar finding have been reported by J Hazarika et al (R6) showing preponderance of E.coli and Klebsiella among their urinary isolates. The resistance in E.coli to fluroquinolones in the present study (76%) is in concordance with R6. This is similar to those reported by Shalini et al and Asha Pai KB et al

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Dominance of gram negative bacteria from pyogenic lesions is seen in many other study groups also . The study of Basu et al reported Pseudomonas as the dominant gram negative pyogenic isolate which is in synchrony with our results. Staphylococcus aureus is the most common gram positive isolate. The prevalence of MRSA as seen in our study is similar to the study.

Staphylococcus aureus was the most common gram positive pathogen obtained from 30 isolates having pyogenic infections with only 33% sensitivity to fluoroquinolones.

Out of 31 blood culture isolates 13 (41%) were gram negative including 5 isolates of Klebsiella pneumoniae with 60% sensitivity, Citrobacter freundii 4 samples with 100% sensitivity and 3 samples of Pseudomonas aerugionosa with 100% sensitivity.Coming to the gram positive spectrum 11 isolates of Coagulase negative Staphylococci were obtained from blood cultures showing 27% sensitivity to fluoroquinolones. R. Surpam et al reported 13 isolates of S.aureus followed by 03 isolates of klebsiella and CONS each amongst 21 isolates from the blood culture study. Among the 31 respiratory pathogens obtained 23 samples (74%) were gram negative and rest (26%) were gram positive.

Klebseiella pneumoniae was the most common pathogen with 11 (35.48%)isolates with only 9% sensitivity and 6 isolates of E.coli with 16% sensitivity.

Staphylcoccus aureus and Streptococcus pyogenes were the common gram positive isolates from sputum samples. None of the three isolates of both these pathogens was sensitive to fluoroquinolones.

Quinolone resistance

In the study on antibiotic resistance profile of clinical isolates of bacteria from a tertiary care hospital R.Surpam et al found 60 % of E,coli and 55% of klebsiella species were resistant to ciprofloxacin. Similar results were observed in a study by Hossam MA et al while, higher resistance was reported by Dutta S et al and Nazneen et al. The increased use of fluoroquinolones might have resulted in increased resistance in their study. Our results in concordance with their studies.

Kaushal V Seth et al studied antibiogram of bacterial isolate from ICU patients and found that gram negative isolates were 100% sensitive to levofloxacin.

Nearly, 33 and 29 % of their ICU patients were prescribed ciprofloxacin and levofloxacin respectively whereas only 5% received ofloxacin.

The restricted use of flouroquinolones was reflected in higher sensitivity to ciprofloxacin, ofloxacin and levofloxacin by gram negative bacilli like klebsiella pneumonia, pseudomonas aeruginosa and E.coli.

Pseudomonas aeruginosa showed good sensitivity to these flouroquinolones ranging from 88% to 100% among icu patients. Although a small number of p.aeruginosa isolates (03) obatained from blood culture in present study, they showed 100% sensitivity to flouroquinolones.

Although antibiotic policy is available in our hospital, strict adherence to policy guidelines and recommendations for timely revision of policy is essential. The culture of prescribing antibiotics only after culture and sensitivity testing needs to be adopted, rather than empiric treatment without any indication. It is the need of the hour that the clinical microbiologists, clinical pharmacologists work hand in gloves with the clinicians to improve the rational use of antibiotics in our setting. This also calls for automation in microbiology laboratories for early and precise identification of pathogen and their antibiotic sensitivity profile.

Conclusion:

The present study revealed an alarming situation that we are losing a useful broad spectrum group of antibiotics like flouroquinolone in our set up. Our study emphasizes the need for regular monitoring of antibiotic resistance pattern among the bacterial isolates obtained from various infections in patients admitted in our facility. There is also need to regularly monitor the antibiotic use in our hospital to enable us to control the antibiotic resistance and to take measures to promote rational use of antibiotics.

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