

A Retrospective Analysis of Prevalence of Uropathogens and Antibiotic Sensitivity Pattern in Patients of Urinary Tract Infection in a Tertiary Care Teaching Hospital

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ABSTRACT


Background: Antibiotic Resistance has now become a big threat as antibiotics are no more useful now a days, as they were previously. The objective of this study was to analyse the various bacterial isolates found in Urinary Tract Infection. **Methods:** This Retrospective study was conducted in the department of Microbiology in collaboration with the department of Pharmacology of Pacific Medical College and Hospital, Udaipur, Around 705 culture proven urine isolates were retrospectively studied. The samples were collected during one year from both the inpatient as well as the outpatient department of Pacific Medical College and Hospital, Udaipur. **Results:** Uropathogenic strains from inpatient and outpatient departments were studied for their susceptibility profiles. The various isolates were *Escherichia coli*, *Klebseilla pneumoniae*, *Pseudomonas aeruginosa*. Antibiotic susceptibility pattern of these isolates revealed that for outpatients, first generation Cephalosporins, nitrofurantoin, Norfloxacin/ciprofloxacin were effective for treatment of urinary tract infection but for inpatients, parenteral therapy with newer aminoglycosides and third generation Cephalosporins should be administered as the organisms for nosocomial UTI exhibit a high degree of drug resistance. **Conclusion:** Culture and sensitivity of the isolates from urine samples should be done as a routine before starting the antimicrobial therapy.

Key words: Urinary Tract Infections, . *Escherichia coli*, *Klebseilla pneumoniae*, Antimicrobial agents.

INTRODUCTION

Antimicrobial Resistance has now become a big problem in this era, because the drugs which were useful earlier are no more efficacious due to antibiotic resistance. Despite the widespread availability of antibiotics, UTI remains the most common bacterial infection in the human population.^[1] Antibiotics are usually given empirically before the laboratory results of urine culture are available. To ensure appropriate therapy, current knowledge of the

organisms that cause UTI and their antibiotic susceptibility is mandatory.^[2] Much of the data is available for community acquired infections. This may be different from that of hospital acquired infections. Since patterns of antibiotic resistance in a wide variety of pathogenic organisms may vary even over short periods and depend on site of isolation and on different environments, periodic evaluation of antibacterial activity is needed to update this information.^[3-5] In this context, the present study, was carried out for hospitalised patients with UTI and those attending the outpatient department with UTI. Clinical laboratory records of cases of urinary tract infection were studied for the spectrum of bacterial isolates and their antibiotic susceptibility results were analysed for recommending suitable therapy.

Access this article online	
Website: www.iabcr.org	Quick Response code
DOI: 10.21276/iabcr.2016.2.3.14	

Received:05.06.16| Revised:10.06.16| Accepted:15.06.16

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MATERIALS AND METHODS

This Retrospective study was conducted in the department of Microbiology in collaboration with the department of Pharmacology of Pacific Medical College and Hospital, Udaipur.

Around 705 culture proven urine isolates were retrospectively studied. The samples were collected during one year from both the inpatient as well as the outpatient department of Pacific Medical College and Hospital, Udaipur. Majority of the samples were midstream urine specimens, and others included catheterized urine samples and supra pubic aspirates.

Culture was done by the calibrated loop technique delivering 0.001 mL of urine and plated on Cystine-Lactose-Electrolyte Deficient (CLED) agar plates. For gram-negative bacilli more than 10⁵ colonies per mL of urine, whereas for gram positive cocci 10³-10⁵ colonies per mL were considered significant.^[6,7] The colonies were identified by standard biochemical tests and sensitivity of the organisms was performed by modified Stoke's disk diffusion method on Mueller Hinton agar plates.^[8]

RESULTS

Out of the 705 patients of UTI, 404 were indoor patients (207 females and 167 males) and 301 (249 females and 57 males) were from outpatient department. Uropathogens isolated are shown in Table. Among indoor patients, high percentage of strains showed resistance to Cotrimoxazole. First generation Cephalosporins were effective for E. coli, while newer Aminoglycosides like amikacin and third generation Cephalosporins were found to be effective against K. pneumoniae and P. aeruginosa, and ineffective against Acinetobacter species.

Amongst the outdoor patients, more than 50% patients showed E. coli as the commonest isolate which was 70%-80% resistant to Cotrimoxazole and Aminopencillin, however, first generation Cephalosporins, nitrofurantoin and Norfloxacin were effective but in cases where UTI was associated with agents other than E. coli, amikacin and third generation Cephalosporins were found to be effective (Fig).

Table: Percentage of patients with Urinary Tract Infection

Bacteria	Outpatient (%)	Inpatient (%)
<i>E.Coli</i>	74.0	58.5
<i>K.pneumoniae</i>	14.2	24.7
<i>P.mirabilis</i>	2.7	4.4
<i>P.aeruginosa</i>	5.4	10.0
<i>E.faecalis</i>	4.0	2.4

DISCUSSION

This study shows that the pathogens causing UTI in community and hospital set up show different percentages of prevalence (Table).

In our study, E. coli predominated amongst the indoor as well as outdoor patients, K. pneumoniae being the second commonest in the indoor patient group followed by P. aeruginosa, Enterococcus faecalis. In a similar study of urinary isolates, E. coli was found to be the commonest isolated organism followed by Klebsiella, S. aureus, Proteus species and Pseudomonas aeruginosa.^[9] In accordance with our results, similar study conducted by Devmurari D et al. 2015, showed that the most common

organism isolated from Urine samples was E. coli, 47%(n=94).^[10]

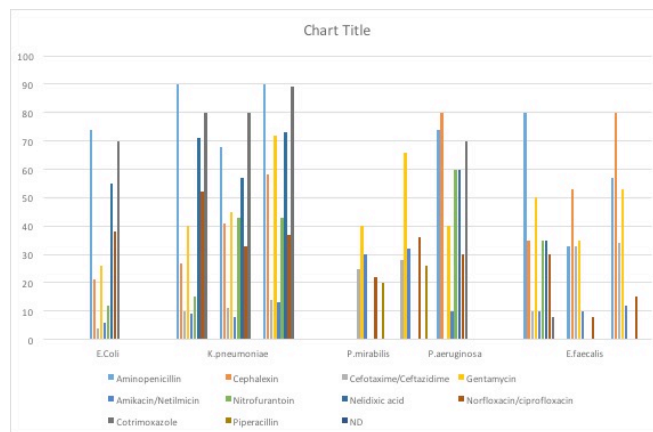


Fig: Pattern of Microbial Resistance in Uropathogens

But in a similar study from Aurangabad, in a combined population group of indoor as well as outdoor patients, Klebsiella was found to be the commonest followed by E. coli, P. aeruginosa and S.aureus.^[11]

A study done in children showed that nosocomial UTI is more due to organisms like Pseudomonas, Acinetobacter and Enterococcus while E. coli infection shows a decrease in incidence.^[12]

While in outpatients, oral first generation Cephalosporins, nitrofurantoin and fluoroquinolones may be effective, in indoor patients newer aminoglycosides and third generation Cephalosporins are the only effective drugs. For Pseudomonas aeruginosa, amikacin, ceftazidime and piperacillin are the recommended antibiotics. Enterococcus faecalis was found to be susceptible to netilmicin and ciprofloxacin. However, no vancomycin resistant enterococci was found in our study. Acinetobacter infection in hospitalised patients showed high degree of resistance to almost all the antibiotics used routinely necessitating its susceptibility testing for newer drugs. Cotrimoxazole in the present study was no longer found to be effective for UTI as all the Uropathogens showed high degree of resistance to it.

CONCLUSION

In view of the emerging drug resistance amongst bacteria, culture and sensitivity should be done before the commencement of antimicrobial therapy. This would not only help in the proper treatment of the patients but would also discourage the indiscriminate use of the antibiotics and prevent further development of bacterial drug resistance.

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How to cite this article: Patil T, Jain M. A Retrospective Analysis of Prevalence of Uropathogens and Antibiotic Sensitivity Pattern in Patients of Urinary Tract Infection in a Tertiary Care Teaching Hospital. *Int Arch BioMed Clin Res.* 2016;2(3):58-60. DOI: 10.21276/iabcr.2016.2.3.14

Source of Support: Nil, **Conflict of Interest:** None