

Uropathogens and their Susceptibility Pattern : a Retrospective Analysis

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Abstract

Objective: To determine the frequency and antibiotic susceptibility pattern of uro-pathogens.

Setting: Department of Pathology, Ziauddin Medical Hospital Laboratory, Karachi.

Method: A retrospective analysis was done on all the urine samples sent for culture and sensitivity during a seven months period. Two thousand eight hundred and forty four urine samples were received and inoculated in cysteine lactose electrolyte deficient agar (CLED). Positive samples were identified, processed and antibiotic susceptibility was carried out. Data was analyzed using Microsoft® Excel 97.

Results: E. coli (45.6%) was the leading uropathogen followed by candida spp. (10.5%), enterococcus spp. (10.2%). For E. coli ampicillin, ceftazidime, nitrofurantoin and gentamycin sensitivity was 26%, 20%, 79.5%, 65% respectively. Enterococcus isolates showed 60% resistance to ampicillin.

Conclusion: The resistant pattern of uro-pathogens causing urinary tract infections to common antimicrobial agents is changing and must be taken into account when selecting treatment strategies. Therefore, antibiotic policy should be made according to local surveillance data (JPMA 51:98, 2001).

Introduction

Urinary tract infection (UTI) is one of the most common infections observed in clinical practice among community and hospitalized patients¹. Twenty five to 35% of all females suffer from UTI at some stage in their lives². UTI forms 40-50% of the total of nosocomial infections and is a therapeutic problem³, a cause of morbidity renal scarring and end stage renal disease⁴. The choice of antibiotics should depend upon the causative organism and their susceptibility pattern to various antibiotics⁵. Hence, the knowledge on the frequency of the causative organisms and their sensitivity pattern requires reappraisal from time to time for effective treatment⁶. This retrospective study reports the pattern of uropathogens and their antibiotic resistance in a tertiary care hospital.

Material and Methods

A retrospective analysis of 2844 urine samples collected for culture and sensitivity at Ziauddin Medical University Hospital Laboratory from January to July, 31, 1999 was done. All samples were cultured on cysteine lactose electrolyte deficient (CLED) medium. The plates were incubated at 37°C for 24 hours and bacteria were identified by standard methods. Six hundred sixty-six positive urinary cultures were processed and antibiotic sensitivity was done by Kirby-Bauer disc diffusion method. The data so obtained was recorded and was analyzed using program Microsoft® Excel 97.

Results

A total 2844 samples were collected and 666 (23%) gave positive urine culture with various uropathogens.

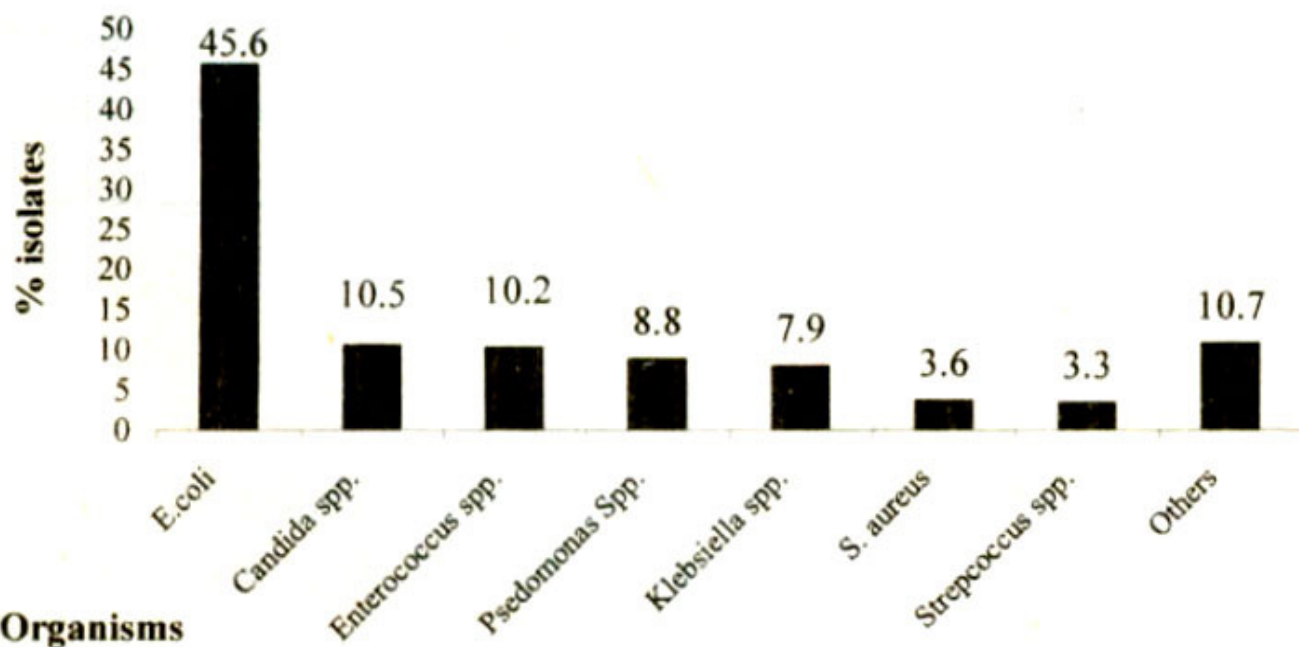


Figure. Frequency of uropathogens.

Figure 1 shows E.coli as the common uropathogen followed by Candida species and gram positive Enterococcus species. Candida species were isolated 78.5% from hospitalized patients. There is a high resistance pattern of E.coli to ampicillin (74%) and ceftazidime (80%) respectively.

Table. Antibiotic resistance of Uropathogens (%).

Antibiotics	E. coli	Enterococcus	Pseudomonas	Klebsiella
Ampicillin	74	67	-	84
Ceftazidime	80	2	-	3
Co-trimoxazole	25	78	-	47
Gentamycin	35	26	20	30
Nalidixic Acid	54	63	-	36
Nitrofurantoin	21	46	-	57
Quinolones	46	42	-	14

Table 1 refers to antibiotics to which bacteria were resistance. E.coli and Kiebsiella species showed similar resistant pattern to ampicillin (74 and 84% respectively) and to gentamicin ("35 and 30% respectively). Pseudomonas species was 20% resistant to gentamicin. S. aureus showed 12.5% resistance to methicillin.

Discussion

The spectrum of uropathogens isolated from urine in this study is not too different from that reported in

literature. Throughout Pakistan various studies⁷⁻¹³ had been conducted for causative agents of UTI, which reports that E.coli is the leading pathogen. Our study shows similar findings. Candida species is the second common pathogen; this finding is not comparable with other studies done in Pakistan⁷⁻¹³. Enterococcus species is the third most common pathogen in our study; similar reporting is done by Nizami et al.⁷ showing that now gram positive bacteria are becoming one of the main uropathogens of UTI.

The resistant pattern of E.coli against ampicillin had been raised to 20-25% in past decade. Khan et al.⁸ also report that ampicillin is least effective E.coli strains in 1989⁹ were sensitive to nitrofurantoin, nalidixic acid but after 10 years the resistance rate had increased to almost 50 to 60% and in cases of quinolones up to 13 to 25% while that of cotrimoxazole had been decreased. The decreasing pattern of resistance could be due to abandoning first line of drugs and using new and strong antibiotics in the last few years. The resistant pattern of E.coli in our study is same as that of past 2-3 years^{10,11}. The resistance pattern of Klebsiella species is more or less the same as that of E. coli.

In our setting where there is no guideline for antibiotic use, unchecked use will increase the resistant strains of previously sensitive bacteria as reported by laboratory reports^{6,12}. Pseudomonas species were least resistant against gentamicin in last 10 to 15 years^{6,8,13} but resistance pattern has increased now. S. aureus was 12.5% methicillin resistant. A study done in 1989~ showed that at that time there were 5% Methicillin resistance Staphylococcus aureus (MRSA) cases, but no definitive actions were taken to reduce their emergence. For MRSA positive patients, proper screening program should be carried out as set by British Society for Anti-Microbial Chemotherapy¹⁵.

The study shows that there was not a single antibiotic, which showed zero percent resistance against any one of uropathogens. This points towards the need of making strict antibiotic guidelines for rational use and the need of continuous surveillance of frequency and antibiotic susceptibility pattern of microorganisms for effective empiric therapy. This has now been carried in few tertiary care hospitals in Pakistan to avoid emergence of new resistant strains.

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