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Research Article

ANTIBIOGRAM STUDY OF AEROBIC BACTERIAL ISOLATES FROM UROPATHOGENS

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ABSTRACT

Background: Bacteria are capable of invading and infecting humans, leading to disease and sometimes death. Systems and tissues in human body are vulnerable to different organisms. Infection pattern is likely to differ by geographical regions. **Aim:** This study was aimed to isolate and identify the type of aerobic bacteria causing Urinary Tract Infections (UTI) in different age groups and sexes, and also in some predisposing conditions. Their antibiogram also was done. **Materials and Methods:** Midstream urine sample collected aseptically from 276 patients were subjected for isolation and identification of aerobic bacteria by standard technique and subsequently antibiogram was done by Kirby –Bayer Method. Both sexes of patients with an age range of 10-70 years and patients with diabetes (22), hypertension (8) and anemia (8) were also included in the study. **Results:** Escherichia coli was the predominant organism(50%) among other isolates – Klebsiella species (27.3%), Proteus species(7.14%), Staphylococcus saprophyticus (5.95%), Staphylococcus aureus (3.57%), Enterococci (3.57%), Pseudomonas species(2.38%). UTI was more common among patients of 60 and more years of age; however, incidence was more in female patients (36.2 – 38.5%) compared with male patients (25-30%). Anemia, Diabetes and Hypertension conditions were found to predispose UTI. Aminoglycosides and Quinolones were found to be more effective against the isolates. **Conclusion:** The present study reveals in spite of the topographical diversity, the infecting bacterial isolates from this area were found to be the same as from any other part of India.

Key words: UTI, Predisposing factors, Antibiogram.

INTRODUCTION

Urinary tract infection (UTI) is the commonest of all infections seen in clinical practice. It is estimated that 10% of the patients visiting hospitals suffer from UTI.¹ Both sexes of all age groups are vulnerable to UTI. Women are especially prone to UTI. It is estimated that 20% of women experience UTI in their life time.² UTI is one major cause among hospital acquired infections.²

Apart from socioeconomic reasons such as illiteracy, ignorance and insanitation other factors are known to predispose UTI which could be anatomical position of

the urethra, prostate hypotrophy, renal calculi, stricture urethra, catheterization, and diabetes.³⁻⁵

UTI presents protein manifestations and may also be asymptomatic.⁶ Reports indicates that different spectrum of aerobic bacteria causes UTI. There seems to be change in type of organisms in different areas.⁷ Hitherto study on isolation of aerobic bacteria and their antibiogram associated with UTI has not been done from this area. Hence this study was undertaken.

MATERIALS & METHODS

This study was conducted in the department of microbiology MNR Medical College and Hospital, Sangareddy, Andhra Pradesh; from September 2008 to August 2009. Two hundred and seventy six midstream urine samples were collected in sterile container, from patients from whom consent was obtained, with a suggestive history of UTI. These patients were from 10 to 70 years of age; and of sex, 8 patients with essential hypertension, 22 with diabetes mellitus and 36 with anemia. Pregnant women, women having thyrotoxicosis, genitourinary procedure, carcinoma, vaginitis, proctitis, recipient of renal transplant were excluded from this study.

Midstream urine samples collected aseptically & with all sterile precautions from the patients with symptoms like fever, chills, frequency, and urgency of urination, dysuria and suprapubic pain were inoculated onto MacConkey Agar, Blood Agar and Urichrome Agar, and incubated at 37°C for 18-24 hours for isolation. Identification of the aerobic bacteria was performed by various biochemical reactions.⁸ Antibiotic sensitivity was done by disc diffusion method (Modified Kirby Bayer) on Mueller-Hinton agar⁹ using Amoxycillin (AMC) 20mcg, Cefepime (CPM) 30mcg, Cefotaxime (CTX) 30mcg, Amikacin (AK) 30mcg, Gentamicin (G) 10mcg, Ofloxacin (OF) 5mcg, Ciprofloxacin (CIP) 5mcg, Norfloxacin (NR) 10mcg, Nalidixic Acid(NA) 30mcg, Nitrofurantoin (NIT) 300mcg and Cotrimoxazole (COT) 1.25mcg discs from Himedia Pvt Ltd.

Ethical clearance: Clearance from institutional ethical committee was obtained prior to conducting this study

RESULTS & DISCUSSIONS

Total of 276 midstream urine samples, collected aseptically were processed for isolation of aerobic bacterial isolates, using standard methods.⁸ Out of 276 samples, 84 (30.43%) yielded aerobic bacterial isolates (Table 1). The results indicate that out of 84 positive aerobic isolates, 42 (50%) *Escherichia coli* followed by *Klebsiella spp.* 23 (27.38%), *Proteus spp.* 6 (7.14%), *Staphylococcus saprophyticus* 5 (5.45%), *Staphylococcus aureus* and *Enterococci* each 3 (3.57%) and the least isolate was *Pseudomonas spp.* 2 (2.33%).

Our findings 84 (30.43%) out of 276 were considerably higher compared to the reports from Aziz

Marjan Khattak⁸ which were 6.2%. Present findings of the percentage of UTI which are noticeably high is probably due to illiteracy, ignorance on the part of the population and also that the study region comprises of many poorly sanitated towns & villages. It was also observed that the public & personal hygienic conditions are poor.

Table: 1 Aerobic bacteria isolated from urine

Aerobic bacterial isolates	No of isolates	%
<i>Escherichia coli</i>	42	50%
<i>Klebsiella Spp</i>	23	27.38%
<i>Proteus spp</i>	6	7.14%
<i>S. saprophyticus</i>	5	5.95%
<i>S. aureus</i>	3	3.57%
<i>Enterococci</i>	3	3.57%
<i>Pseudomonas spp</i>	2	2.38%

*Total number of samples studied = 276, number of positive samples = 84

The present study indicates that the predominant isolate was *Esch. coli* (50%). Various studies^{7,11-13} (Table:2) on aerobic bacterial isolates from urine samples including both sexes and all age groups show a wide range of percent isolates from 30 – 53%.

Table 2: Aerobic isolates from other workers

References	% of aerobic isolates	Predominant organism
Acharya et al	30%	<i>E. coli</i>
Shobha Ram et al	45.5%	<i>E. coli</i>
Mandal et al	53%	<i>E. coli</i>
Ethel et al	53%	<i>E. coli</i>

Incidence of aerobic bacterial isolates from UTI in male and female patients with age ranging from 10 – 70 years is shown in Table: 3.

Table 3: Incidence of aerobic bacterial isolates from UTI among male and female of different age groups

Age (Years)	Male			Female		
	Total	+Ve	%	Total	+Ve	%
10 - 20	20	5	25	16	6	37.5
21 – 30	22	4	18.1	52	19	36.5
31 – 40	32	6	18.7	36	14	38.5
41 – 50	16	4	25	25	8	32
51 – 60	13	3	23	23	8	34.7
>61	10	3	30	11	4	36.3

Incidence was moderately higher in female patients than male patients and in the age group of 60 – 70 years in males, whereas prevalence is almost same in

all age groups in female patients. Our findings are almost consistent with the findings of Marie-vic O et al.¹⁴

Women are prone to develop UTI and 20% of women are known to develop UTI sometime during their lifetime. More incidences in males could be due to retention of urine due to prostate enlargement as it is known that residual urine as minimal as 2-3ml is likely to cause UTI.

Predisposing factors such as some metabolic diseases might play some role in UTI¹⁷. Hence the study was done to know the role of diabetes, hypertension, anemia¹⁷ which are common ailments, nowadays. Proven cases were considered for the study and the results are depicted in Table: 4

The results indicate the association of these diseases with UTI. However, more detailed study in this area needs to be done. Studies conducted by Bahl et al (1970)¹⁵, Hansen RO (1964)¹⁶ on association of UTI with diabetes and hypertension respectively throws

some message in this direction. Mandal et al. reported 64.3% diabetics having UTI.⁶

Table 4: Association of UTI with other conditions

Diseases	No of cases studied	No of +ve cases
Diabetes	22	6 (23.2%)
Hypertension	8	2 (25%)
Anaemia	36	8 (22.2%)

Another important factor of the study was to evaluate the antibiotic pattern of the bacterial isolates from the UTI patients. The results are shown in Table 5.

Our study revealed that Esch. coli which was a predominant isolate showing multidrug resistance, particularly higher resistance to Nalidixic acid, hitherto considered drug of choice for UTI. It highlights the point that without confirming the sensitivity pattern of the organism, it is not advisable to use the drug for treatment. Klebsiella showed resistance to almost all antibiotics used. Proteus was found to be less resistant to the antibiotics used

Table 5: Antibiotic sensitivity of the isolate

Organism	Penicillin	Cephalosporins		Aminoglycosides		Quinolones					COT
	AMC	CPM	CTX	AK	G	OF	CIP	NR	NA	NIT	
E.coli	19	16	15	24	33	18	15	22	8	26	14
Klebsiella	8	10	8	17	19	13	9	14	17	7	6
Proteus	3	4	4	5	5	3	3	4	4	2	1
Staph. sapro	3	2	4	2	3	4	3	4	5	4	2
Enterococci	-	-	-	-	-	2	1	2	-	3	-

The antibiotic pattern in this study correlates with the result of McFadyen et al¹⁸. (AMC – Amoxyclav, CPM – Cefepime, CTX – Cefotaxime, AK – Amikacin, G – Gentamicin, OF – Ofloxacin, CIP – Ciprofloxacin, NR – Norfloxacin, NA - Nalidixic Acid, NIT - Nitrofurantoin, COT - Cotrimoxazole)

CONCLUSION

In spite of the topographical diversity the infecting bacterial isolates from this area were found to be the same as from any other part of India. Aerobic urinary pathogens infectivity percentage is almost same as is shown by other studies from different parts of our country. Although incidence and infectivity pattern match with other studies, antibiotic susceptibility profile needs to be done for every isolate for proper treatment.

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