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RESEARCH ARTICLE

ANTIBIOTIC SUSCEPTIBILITY PATTERN OF UROPATHOGENS ISOLATED FROM URINARY TRACT INFECTION AT VASAVI HOSPITAL BANGALORE-A PRELIMINARY STUDY

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ABSTRACT

Urinary tract infection (UTI) is one of the most common diseases seen in the community. Aim of the present study is to find out etiological agents and their antibiotic susceptibility, causing urinary tract infections at Vasavi Hospital Bangalore. A total of 810 (278 males and 532 were females) clinically suspected cases of urinary tract infection attending the OPD of Vasavi Hospital Bangalore formed the study group. This is a retrospective study from Aug 2018 to Feb 2019 (7 months). The age ranged from 1 to 75 years. Out of 810 (278 males, 532 females) cases, 164 (20.25%) were culture positive and 646 (79.75%) showed no growth. Among culture positive, 104(63.41%) were females and 60 (36.59%), males. Among the isolates, 144(87.8%) belonged to family Enterobacteriaceae, 12 (7.32%) Enterococci and 8 (4.88%) were non fermenters. Esch.coli (69.51%) was the predominant pathogen among the isolates. Antibiogram of enterobacteriaceae in the present study showed that Nitrofurantoin (84.03%) can be considered as the choice for treating uncomplicated UTI .

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INTRODUCTION

Urinary tract infection (UTI) represents one of the most common diseases encountered in medical practice today and occurring from neonate to the geriatric age group (Kunin, 1994). Despite the widespread availability of antibiotics it remains the most common bacterial infections in humans (Sharma SG, 1997). To ensure appropriate therapy knowledge of uropathogens prevalent in this area and their antibiogram is essential for the clinician especially for empirical antibiotic therapy. Aim of the present study is to find out etiological agents and their antibiotic susceptibility pattern causing UTI at Vasavi Hospital, which is a 150 bedded Hospital in Bangalore. The study was conducted after the approval from the institutional review committee.

MATERIALS AND METHODS

This is a retrospective study from August 2018 to February 2019 (7 months). A total of 810 (278 males and 532 were females) clinically suspected cases of urinary tract infection attending the OPD of Vasavi Hospital, Bangalore formed the study group.

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Midstream urine specimen was collected from each patient and processed in Microbiological Laboratory. Semi quantitative standard loop method was used. Blood agar and Chrom agar plates were used. Growth showing significant bacteriuria (10^5 bacteria/ml) was considered as a UTI case. Bacterial identification was done by proteomic studies (MALDI TOF /MS-Biotyper). Antibiogram was done using VITEK2-Compact.

RESULTS

The age of the study group ranged from 1 to 75 years. Out of 810 urine samples processed, 164(20.25%) were culture positive and 646(79.75%) showed no growth. Among culture positive, 104(63.41%) were females and 60(36.59%), males. Among the isolates, 144(87.80%) belonged to family Enterobacteriaceae, 12(7.32%) Enterococci and 8 (4.88%) were Non fermenters.

DISCUSSION

UTI ranks among the most common infections in developing countries like India. Uropathogens at a local level yield important information regarding emerging problems of antibiotic resistance and provides assistance in managing empirical therapy (Yvonne et al, 2004). UTI was more common in females in the age 21-40 years (75%) and in males \geq 60 years (56.25%) which is in comparison with study of Smitha Sood et al.

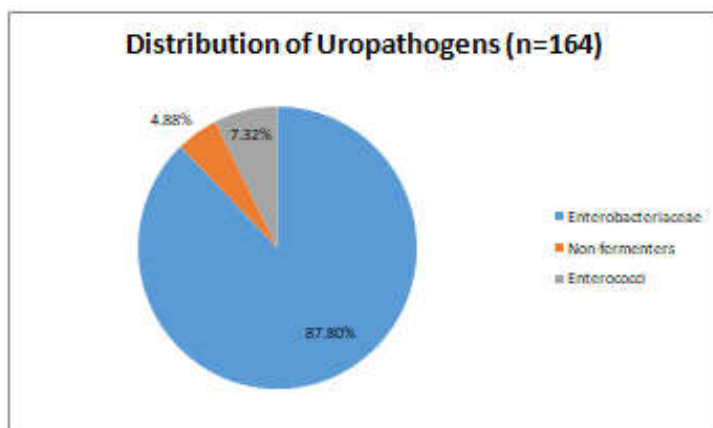


Figure 1. Distribution of uropathogens in the present study

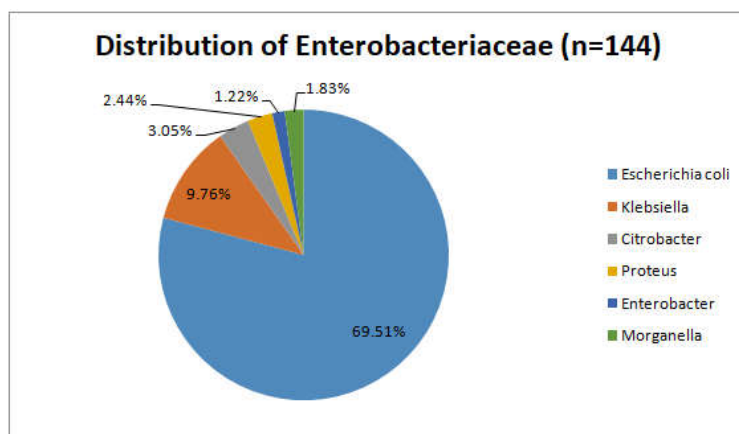


Figure 2. Distribution of Enterobacteriaceae in the study group

Table 1. Uropathogens isolated in 164 cases

Pathogens (n=164)	Number	Percentage
Escherichia coli	114	69.51
Klebsiella pneumonia	16	9.76
Citrobacter spp	5	3.05
Proteus spp	4	2.44
Enterobacter spp	2	1.22
Morganella morganii	3	1.83
Non fermenters	8	4.88
Enterococci	12	7.32

Table 2. Antibiotic Susceptibility pattern of uropathogens

Antibiotics	Enterobacteriaceae (%)	Non-fermenters (%)	Enterococci (%)
Nitrofurantoin	84.03	0	75
Norfloxacin	36.81	37.75	33.33
Cefixime	40.97	12.5	0
Ciprofloxacin	38.89	37.5	33.33
Amoxicillin/clavulonic acid	36.11	12.5	0
Piperacillin/tazobactam	84.72	50	58.33
Cefoperazone/sulbactam	75.69	62.5	41.67
Amikacin	84.72	62.5	25
Gentamicin	72.92	62.5	66.67
Ampicillin	-	-	50
Meropenem	-	75	-
Ceftazidime	-	50	-
Tigecycline	-	12.5	100
Imipenem	-	25	-
Linezolid	-	-	83.33
Vancomycin	-	-	83.33
Teicoplanin	-	-	83.33

Table 3. Antibiotic susceptibility pattern of family Enterobacteriaceae

Antibiotics	E.coli	Klebsiella pneumoniae	Citrobacter spp	Proteus spp	Morganella morganii	Enterobacter spp	Total (n=144)
Nitrofurantoin	97.37	31.25	60	0	0	100	84.03
Norfloxacin	35.09	62.50	40	25	0	0	36.81
Cefixime	40.35	37.50	80	50	33.33	0	40.97
Ciprofloxacin	37.72	62.50	40	25	0	0	38.89
Amox/Clav	35.09	50	40	50	0	0	36.11
Pip/Tazo	86.84	87.50	40	75	100	50	84.72
Cefo/Sulbact	74.56	87.50	40	75	100	100	75.69
Amikacin	87.72	81.25	40	75	100	50	84.72
Gentamicin	72.8	87.50	40	50	100	50	72.92

Females are more prone to develop UTI due to short urethra, its proximity to anus, urethral trauma during sex and stasis of urine during pregnancy (Kamat US *et al*, 2009). Incidence of UTI increases among males due to prostate enlargement and neurogenic bladder (Maheshwary *et al*, 2018). Of the 810 suspected cases, 164(20.25%) showed significant bacteruria which is higher than the studies of Akram M *et al*, Eshwarappa *et al* and Smitha Sood *et al*, and less than the study of Dash *et al* and Mehta M *et al*. Present study showed high prevalence of UTI in females (63.41%) than in males (36.59%) which correlates with other studies (Smitha Sood *et al.*, 2012; Ruhi Khan *et al.*, 2015; Maheswary *et al.*, 2018; Syed *et al.*, 2012). The study demonstrates that Escherichia coli remained the leading uropathogen being responsible for 69.51%. This is in comparison with the other studies (Yvonne *et al.*, 2004; Smitha Sood *et al.*, 2012).

The Enterobacteriaceae group showed higher susceptibility to Nitrofurantoin (84.03%) in contrast to non-fermenters which showed 100% resistance. Enterococci isolates were susceptible to Nitrofurantoin (75%). Esch. coli showed 97.37% susceptibility to Nitrofurantoin which correlates with the studies of Yvonne *et al* and Maheshwary *et al*. The high resistance rates to various antibiotics among the uropathogens could be due to indiscriminate use of antimicrobials by private practitioners, inappropriate dosing and short course therapy with antibiotics. Availability of drugs over the counter all over the country, and widespread use of antimicrobials in animals has played an important role in the emergence of resistant strains (Maheshwary *et al* 2018).

Conclusion

Before prescribing an empirical antimicrobial therapy, an in-depth knowledge of the uropathogens and the continued evaluation of the susceptibility patterns of uropathogens are essential to avoid irrational drug usage and to ascertain the optimal prophylactic therapy (Syed *et al.*, 2012). Given the fact that Nitrofurantoin has no role in the treatment of other infections, it can be administered orally and is highly concentrated in urine, it may therefore be the most appropriate agent for empirical use in uncomplicated UTI (Ruhi Khan *et al.*, 2015).

Conflicts of interest: Authors had no conflict of interest to declare in relation to this article.

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