EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH
www.ejpmr.com

FREQUENCY AND ANTIBIOGRAM OF URINARY TRACT INFECTION CAUSING ORGANISMS IN DIABETIC PATIENTS

Pradeep Kumar Mishra[1], Sudhir Singh*[2] and Umar Farooq[3]

[1]Post Graduate Student, MSc. Medical, Department of Microbiology.
[2]Associate Professor, Department of Microbiology.
[3]Professor and Head, Department of Microbiology.
Teerthanker Mahaveer Medical College and Research Centre, Moradabad (U.P). 244001, India.

*Corresponding Author: Sudhir Singh
Associate Professor, Department of Microbiology. Teerthanker Mahaveer Medical College and Research Centre, Moradabad (U.P). 244001, India.

ABSTRACT

Introduction: Urinary tract infections (UTI) are defined as the spectrum of disease caused by invasion of microorganisms to the genitourinary tract. In worldwide dimension diabetes is major problem. The assessment of risk of infection and resulting complications are influenced by duration of illness, severity of non-infectious complications, concurrent illness, adequacy of blood glucose control and degree of medical supervision. **Aim:** To isolate and identify the microorganism from the urine sample of diabetic patients and find out the frequency and antibiogram of isolated microorganism. **Material and Methods:** A total 250 urine samples were collected from diabetic patients attending TMU hospital. Direct microscopy, semi quantitative culture method and antibiotic sensitivity testing was done as per standard guidelines. **Result:** In this study the results revealed that the frequency of UTI is 128 (51.2%) among 250 diabetic patients. *E.coli* was most frequent 69(53.90%) organism isolated, followed by *E.faecalis* 20 (15.62%), *Klebsiella Spp;* 14 (10.93%) *S. aureus* 12(9.37%), *Pseudomonas aeruginosa;* 6(4.68) *Citrobacter Spp*; 4(3.12%), *Acinetobacter Spp;* 2(1.56%), and *Proteus* 1(0.78%). **Conclusion:** UTI frequently occurs in diabetic patients due to an impaired immune status and increased glucose content of the urine. This makes UTI very important to investigate. The proper management of UTI in diabetics is crucial and requires prompt diagnosis and correct use of antibiotics.

KEYWORDS: UTI, Diabetes, E.coli.

INTRODUCTION

Urinary tract infections (UTI) are defined as the spectrum of disease caused by invasion of microorganisms to the genitourinary tract.[1] After respiratory tract infection most common infection is UTI.[2] Urinary tract infections are more prevalent in women than males. Predisposing factors for UTI includes diabetes, elderly, pregnant women, spinal cord injuries patients with catheters and genitourinary tract abnormalities.[3] In worldwide dimension diabetes is major problem. The assessment of risk of infection and resulting complications are influenced by duration of illness, severity of non-infectious complications, concurrent illness, adequacy of blood glucose control and degree of medical supervision.[4] Diabetes mellitus has long been considered to be a predisposing factor for UTI and the urinary tract is the principle site of the infection in diabetics with increased risk of complications of UTI.[5,6] The incidence of diabetes mellitus is increasing markedly throughout the world and is becoming a serious public health threat particularly in the developing countries. Diabetes mellitus is associated with many complications and in the long run it has some major effects on the genitourinary system which makes diabetic patients more labile to UTI, particularly to upper urinary tract infections.[7] Patients either with Type1 DM or Type2 DM are at increased risk for urinary tract infections. Diabetes causes several abnormalities of the host immune system that may result in a higher risk of infection like UTI.[8] This study was aimed to isolate and identify the microorganism from the urine sample of diabetic patients and find out the frequency and antibiogram of isolated microorganism.

MATERIAL AND MEHODS

This study was conducted in Teerthanker Mahaveer medical college and Research Centre, from January 2018 to October 2018. On which total number of 250 suspected diabetic samples were processed. Urine samples clean catched midstream urine sample was collected in sterile wide mouthed universal container, catheter sample also included for identification. All the samples were processed for wetmount and semi quantitative culture method on CLED agar. Positive growth was identified by gram staining, rapid test & biochemical reactions as per standard guidelines.

RESULTS

In present study we included 250 suspected diabetic cases from January 2018 to October 2018. Out of 250 urine samples, 64%(160) were females and 36% (90) were males. Out of them UTI was diagnosed in 128 patients, there was female preponderance 56.25 %(90) than males.
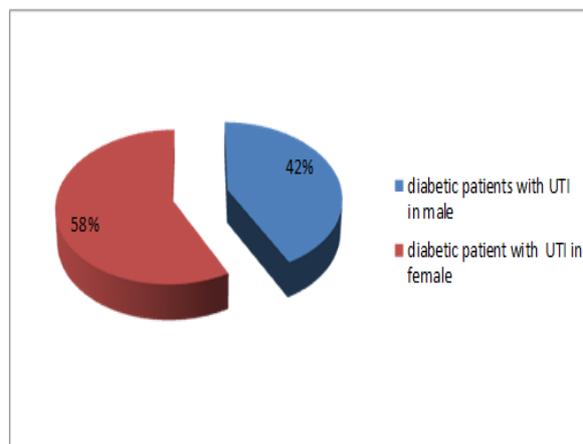

Table 1: Organisms isolated in urinary samples of diabetic patients.

S.NO	Isolated organism	Number	Percentage
1.	Escherichia coli	69	53.90%
2.	Enterococcus faecalis	20	15.62%
3.	Klebsiella species	14	10.93%
4.	Staphylococcus aureus	12	9.37%
5.	Pseudomonas aeruginosa	6	4.68%
6.	Citrobacter species	4	3.12%
7.	Acinetobacter species	2	1.56%
8.	Proteus mirabilis	1	0.78%
	Total	128	100%

As shown in table1 the most common organism isolated was E.coli (53.90%). Most of the organisms were found sensitive to polymixin B (100%), however some were resistant to carbapenems. Nitrofurantoin was resistant in 50% of cases as shown in table 2. Among gram positive organisms, vancomycin was found sensitive in all *S. aureus* however found resistant in 2 cases of *E. faecalis* as described in table 3.

Table 2: Drug resistance pattern of gram negative organisms commonly isolated in UTI patients.

Antibiotics	E. coli (69)	Klebsiella spp. (14)
Ampicillin	35(50.72%)	10(71.42%)
Ampicillin /Sulbactum	32(46.37%)	4(28.57%)
Imipenum	13(18.84%)	10(71.42%)
Meropenum	11(15.94%)	7(50%)
Etrapenum	12(17.39%)	7(50%)
Chloramphenicol	11(15.94%)	13(92.85%)
Tetracycline	40(57.97%)	1(7.14%)
Nitrofurantoin	31(44.92%)	7(50%)
Ciprofloxacin	31(44.92%)	7(50%)
Levofloxacin	29(42.02%)	7(50%)
Cefazolin	29(42.02%)	4(28.57%)
Ceftriaxone	31(44.92%)	1(7.14%)
Cefoparaxone	25(36.23%)	7(50%)
Gentamycin	32(46.37%)	1(7.14%)
Amikacin	29(42.02%)	4(28.57%)
Tobramycin	26(37.68%)	7(50%)
Polymixin B	0(00%)	0(00%)
Cotrimoxazole	35(50.72%)	1(7.14%)
Netlimycin	38(55.07%)	7(50%)

Table 3: Drug resistance pattern of gram positive organisms commonly isolated in UTI patients.

Antibiotics	Enterococcus faecalis (n=20)	S. aureus (n=12)
Amoxycillin/clavulinic acid	14(70%)	8(66.66%)
Amoxycillin	12(60%)	10(83.33%)
Ampicillin/sulbactum	15(75%)	8(66.66%)
Vancomycin	2(10%)	0
Cephalexin	10(50%)	9(75%)
Co-triamoxazole	14(70%)	8(66.66%)
Nitrofruntoin	12(60%)	5(41.66%)
Norfloxacin	10(50%)	6(50%)
Ciprofloxacin	10(50%)	7(58.33%)
Cefotaxime	16(80%)	6(50%)
Teicoplanin	4(20%)	2(16.66%)
Linezolid	2(10%)	2(16.66%)
Ofloxacin	12(60%)	8(66.66%)
Clindamycin	8(40%)	6(50%)
Tobramycin	4(20%)	4(33.33%)

DISCUSSION

According to Kilpatric ES, Bloomgarden ZT, *et al,* (2009)The overall prevalence of UTI was 37%. Female preponderance was higher 43% and male was 30%.[9] Study conducted by Ramana BV, chaudhary A *et al,* (2012) frequency of uropathogens in diabetic patients were 1200 urine samples, out of which females (760) and males (440) samples respectively. The overall frequency of urinary tract infection was 45% and the frequency rate was higher in females (46%) than males (43%).[10] Prakash D. *et al* and Prakasam A K.C *et al,* (2013) conducted study on bacterial UTI diabetic and found positive result in 41 (69.49%) females, 23 (31.51), males among (132) and 65 % females, 35 % male among (200) samples respectively which is similar to other study.[11]

UTI is one of the most common infection in humans, and a major cause of morbidity. It is a common condition that occurs in both female and male of all the ages. The frequency of UTI is higher in women than in men due to several factors including anatomical differences, hormonal effects and behavioural pattern. In this study the results revealed that the frequency of UTI in diabetic patient is 51.2% positive and 48.8% negative out of 250 diabetic patients. In the present study, out of 250 samples, *E.coli* was most frequent 69(53.90%) causing UTI, followed by *Enterococcus* 20 (15.62%), *Klebsiella Spp;* 14 (10.93%) *Staphylococcus aureus* 12(9.37%), *Citrobacter Spp*; 4(3.12%), Acinetobacter spp. 2(1.56%), and Proteus spp.

Antibiotic resistance has increased over years, varies from country to country, and is a major clinical problem in treating infections caused by these microorganisms. Maximum isolates (85–90%) showed high resistance to cefotaxime, norfloxacin, nalidixic acid, cotrimoxazole, and amoxy-clavulanic acid while resistance to gentamicin and amikacin was found to be approximately 40-45%. Amikacin has to be administered parenterally and it is nephrotoxic. These findings were in accordance with other studies.[12,13] Increased resistance might be due to widespread, inappropriate use of antibiotics and production of extended spectrum beta lactamases in these isolates.[14] Carbapenems are the drug of choice for isolates producing ESBL as carbapenem group is highly stable against *β*-lactamase. With increasing resistance among most antibiotics, a urine culture with sensitivity pattern of isolates should be obtained before starting treatment.

CONCLUSION

UTI Frequently occurs in diabetic patients due to an impaired immune status and increased glucose content of the urine. This makes UTI very important to investigate. Complicated UTI may be infrequent but are more common in diabetics with severe consequences. The proper management of UTI in diabetics is crucial and require prompt diagnosis and correct use of antibiotics.

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