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RESEARCH ARTICLE

Profile of urinary tract infection in diabetic patients. Data from a general hospital at Jammu and Kashmir, India.

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Abstract

Objective:- Studies reveal an alarming increase in diabetes mellitus and its effects on genitourinary system. The present study is sketched to evaluate the spectrum of the uropathogens and their profiles of antimicrobial resistance on a series of diabetic patients according to age and sex.

Methods:- A fourteen months study of urine culture and sensitivity assay data from admitted diabetic patients who were suffering from urinary tract infection was conducted and the pathogens were isolated and biochemical tests were done to identify the species of pathogens.

Results:- The study showed that females are more vulnerable to pathogenic attack than males. Most common isolate responsible for urinary tract infection (UTI) was *E. coli* (58%) followed by *Klebsiella* (19%), *Enterobacter*, *Proteus*, *Citrobacter*, *Acinetobacter* and *Candida*.

The antibiotic sensitivity patterns of the isolates to various antimicrobial agents showed that the most effective antibiotics overall were Meropenem and Imipenem followed by Cefoperazone / Sulbactam, Nitrofurantoin and Ofloxacin.

Conclusion:- The most common pathogen causing UTI in diabetics was *E. coli* and the most effective antibiotics overall were Meropenem and Imipenem followed by Cefoperazone / Sulbactam, Nitrofurantoin and Ofloxacin.

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Introduction:-

Urinary tract infections are amongst the most common infections encountered in clinical practice in diabetic patients admitted in our hospital. They constitute about one-fourth of all infections in such patients because of the combination of host and local risk factors. Modification of chemical composition of urine in diabetes mellitus can alter the quality of urine and support the growth of micro organisms. Since the concept of significant bacteriuria was introduced the data on the prevalence of asymptomatic bacteriuria appear to be conflicting [1,16]. Bacteriuria and clinical UTI are three to four times more common in diabetic women than in non diabetic ones [2,3,4,7]. Several recent reports have noted a higher prevalence of asymptomatic bacteriuria among women with diabetes than among women without diabetes. However, other studies on asymptomatic outpatient diabetic women reported different results regarding the prevalence of bacteriuria [5]. Autonomic neuropathy in diabetes mellitus impairs bladder emptying and subsequent urological manipulations predisposes to UTI [8].

E. coli are the most common bacterial pathogens causing UTI in diabetic patients, other organisms being *Klebsiella pneumoniae*, *Proteus mirabilis*, *Streptococcus* and *Staphylococcus*, etc.[10,11,12,17]. Fungal UTIs especially *Candidal* occur in hospitalised diabetics with indwelling Foley catheters receiving broad-spectrum antibacterial therapy [13, 14]. Diabetes mellitus can render the kidney susceptible to hematogenous infection by organisms that are usually non virulent by this route, including haematogenous *E. Coli* pyelonephritis [15].

Diabetic patients are at risk of developing UTI, so it is recommended to ensure continued surveillance of resistance rates among uropathogens to ensure appropriate treatment of these infections.

Methods:-

A total of 58 patients were studied for a period of fourteen months. Diagnosis of diabetes was made based on WHO criteria. All these admitted patients were clinically diagnosed to have UTI based on symptoms, routine urine examination or with a corresponding urine culture showing a bacterial count of more than 10^5 cfu / ml of voided urine.

Results:-

A total of 58 urine samples were collected out of which 82.6% (50 patients) were females and 13.7% (8 patients) were males. The overall prevalence rate of UTI was higher in females than males. Among the 58 isolates 14 were infected with *E. coli*, 3 with *Enterococcus*, 3 with *Klebsiella* and *Staph. aureus* each, 1 with *Pseudomonas* and *Acinetobacter* each. The pattern of distribution of patients according to pathogens, age and sex are shown in Table 1. The patterns of sensitivity of pathogens to various antibiotics are shown in Tables 2.

Table 1. Distribution of patients according to pathogen, sex and age.

Microorganism responsible for infection	Number of Patients	Sex		%age		Age (in years)	
		Male	Female	Male	Female	Male	Female
<i>E. coli</i>	14	1	13	1.72	22.4	48	38 to 75
<i>Enterococcus</i>	3	1	2	1.72	3.44	54	44 to 65
<i>Klebsiella</i>	3	2	1	3.44	1.72	48 to 70	40
<i>Staph aureus</i>	3	0	3	0	5.17	NA	60 to 80
<i>Pseudomonas</i>	1	0	1	0	1.72	NA	70
<i>Acinetobacter</i> species	1	0	1	0	1.72	NA	50
Sterile	33	4	29	6.89	50	40 to 65	45 to 70
Total	58	8	50	13.79	86.20	40 to 70	30 to 85

Table 2: Pattern of antibiotic sensitivity of various pathogens in urine culture of diabetic patients.

Antibiotic	Gram -ve bacilli(%)	Gram +ve cocci(%)
Meropenem	100	NA
Imipenem	100	50
Cefoperazone/Sulbactam	100	0
Nitrofurantoin	86.6	100
Amikacin	73.3	NA
Ofloxacin	68	45
Norfloxacin	67	51
Ciprofloxacin	57.1	NA
Piperacillin-Tazobactam	54.5	0
Cefotaxime	45	33
Ceftizoxime	35	63
Levofloxacin	16.6	60
Ceftriaxone	16.6	40

Discussion:-

This study confirmed that the prevalence of UTI among female diabetics was higher when compared to prevalence in males (6). Bacteriological study reveals the involvement of gram -ve enteric organisms that commonly cause UTI such as *E. coli*, *Klebsiella* species and *Proteus* species [9,19-25].

When effectiveness of various antibiotics was studied for UTI based on sensitivity patterns, Meropenem, Imipenem and Cefoperazone - Sulbactam were considered to be the most effective antibiotics followed by Nitrofurantoin and Amikacin. The commonly used antibiotics such as Ceftriaxone, Piperacillin / Tazobactam, Levofloxacin, Norfloxacin, showed less sensitivity (as shown in Table 2). These findings are clearly alarming as our country could be running out of effective antibiotics if this trend continues.

Conclusion:-

The study reveals that female diabetics are more prone to get urinary tract infections than males. *E. coli* is the most common pathogen causing UTI in diabetics [19] and the most effective antibiotics overall Meropenem and Imipenem, followed by Nitrofurantoin and Ofloxacin.

Diabetic patients are more at risk to develop UTI, so it is recommended to ensure continued surveillance of sensitivity rates among uropathogens to ensure appropriate treatment of these infections.

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