ORIGINAL RESEARCH

Analysis of antibiotic sensitivity pattern among diabetic females with asymptomatic bacteriuria

Dr. Rajiv Kumar

Associate Professor, Department of Pharmacology, Rajshree Medical Research Institute, Bareilly, Uttar Pradesh, India

Corresponding author
Dr. Rajiv Kumar
Associate Professor, Department of Pharmacology, Rajshree Medical Research Institute, Bareilly, Uttar Pradesh, India

ABSTRACT
Background: The present study was conducted for assessingantibiotic sensitivity pattern among diabetic females with asymptomatic bacteriuria. **Materials & methods:** Assessment of 100 diabetic female subjects was done. Collection of Mid-stream urine samples was carried out and sent within one hour for processing. Microbiological profile and its Antibiotic sensitivity pattern were analyzed. **Results:** The overall prevalence of asymptomatic bacteriuria among diabetic females was 20 percent. Among these 40 subjects, Escherichia coli, Klebsiella pneumonia, Coagulase negative staphylococciE. coli was mainly resistant to Cephalotin, Ceftriaxone, nalidixic acid and cotrimoxazole. Klebsiella pneumonia was mainly resistant to Ciprofloxacin, Cephalotin, Ceftriaxoneand ampicillin. Coagulase negative staphylococci was mainly resistant to Gentamicin, Ciprofloxacin and Cephalotin while staphylococcus aureus was mainly resistant to Ciprofloxacin and Erythromycin. **Conclusion:** Appropriate empirical therapy for AUB can be instituted timely on the basis of antipoetic sensitivity and resistance pattern.
Key words: Asymptomatic bacteriuria, Antibiotic sensitivity

INTRODUCTION
Diabetes mellitus is a serious chronic illness. It affects approximately 16 million people in the United States, half of whom are undiagnosed. The prevalence of non-insulin-dependent diabetes is higher in women than in men, and more women die each year from diabetes than from breast cancer. Its complications, retinopathy, nephropathy, neuropathy and cardiovascular disease, exact a heavy toll on the individual with diabetes, as well as society. Because of its significant morbidity and mortality in women, diabetes deserves a place in the concerns designated "women's health issues." It deserves more research attention and especially more public awareness, since many of its devastating complications can be prevented by improved detection and control.[1-3]There is increasing evidence that sex and gender differences are important in epidemiology, pathophysiology, treatment, and outcomes in many diseases, but they appear to be particularly relevant for noncommunicable diseases. Many organizations now call for the inclusion of the sex and gender dimension in biomedical research, to improve the scientific quality and societal relevance of the produced knowledge, technology, and/or innovation.[4,5]

Urinary tract infections (UTIs) are a significant cause of morbidity among older adults; however, antibiotic prescriptions for clinically suspected UTIs are often inappropriate. Healthcare providers frequently struggle to differentiate UTI from asymptomatic bacteriuria, particularly in patients presenting with nonspecific symptoms. Patients with baseline cognitive impairments that limit history-taking can be particularly challenging.[6,7]Hence; thepresent study was conducted for assessingantibiotic sensitivity pattern among diabetic females with asymptomatic bacteriuria.

MATERIALS & METHODS
Thepresent study was conducted for assessing antibiotic sensitivity pattern among diabetic females with asymptomatic bacteriuria.A total of 200 diabetic females were analyzed. Only those female subjects were enrolled that were diagnosed with DM type 2 with a history of minimum of past 5 years. However; patients with presence of any other systemic illness or

2234

any anatomical urogenital abnormality were excluded from the present study. Mid-stream urine samples were collected and sent within one hour for processing. Antibiotic sensitivity pattern was also analyzed. Final results were analyzed by SPSS software. Chi-square test, student t test and Mann Whitney U test were used for evaluation of level of significance.

RESULTS

Mean age of the patients was 56.7 years. Out of 200 subjects included, asymptomatic bacteriuria was seen in 40 subjects. Hence; the overall prevalence of asymptomatic bacteriuria among diabetic females was 20 percent. Among these 40 subjects, Escherichia coli, Klebsiella pneumonia, Coagulase negative staphylococci and Staphylococcus aureus was seen on microbiological assessment in 55 %, 25 %, 7.5 % and 12.5 % of the patients respectively. E. coli was mainly resistant toCephalotin, Ceftriaxone, nalidixic acid and cotrimoxazole. Klebsiella pneumonia was mainly resistant to Ciprofloxacin, Cephalotin, Ceftriaxoneand ampicillin.Coagulase negative staphylococci was mainly resistant to Gentamicin, Ciprofloxacin and Cephalotin while staphylococcus aureus was mainly resistant to Ciprofloxacin and Erythromycin.

Table 1: Prevalence of ABU

Parameter	Number of patients	Percentage
Asymptomatic bacteriuria	21	21
Total patients	100	100

Table 2: Microbiological profile

Microbiological profile	Number of patients	Percentage of patients
Escherichia coli	22	55
Klebsiella pneumonia	10	25
Coagulase negative staphylococci	3	7.5
Staphylococcus aureus	5	12.5
Total	40	100

Table 3: Antibiotic sensitive pattern

Microbiological profile	Escherichia coli (n=22)		Klebsiella pneumonia (n=10)		Coagulase negative staphylococci (n=3)		Staphylococcus aureus (n=5)	
	Sensitive	Resistant	Sensitive	Resistant	Sensitive	Resistant	Sensitive	Resistant
Amikacin	14	8	9	1	2	0	5	0
Gentamicin	13	7	7	3	1	1	4	1
Ciprofloxacin	12	10	3	7	1	1	1	4
Cephalotin	3	19	4	6	1	1	-	-
Ceftriaxone	7	15	4	6	-	-	3	2
Nalidixic acid	10	12	5	5	-	-	-	-
Cotrimoxazole	8	15	-	-	1	1	-	-
Tobramycin	-	-	-	-	-	-	-	-
Clindamycin	-	-	-	-	1	1	-	-
Erythromycin	-	-	-	-	1	1	0	5
Vancomycin	5	17	-	-	2	0	5	0
Ampicillin	-	-	0	10	-	-	3	2

DISCUSSION

The steep rise of type 2 diabetes mellitus (T2DM) and associated complications go along with mounting evidence of clinically important sex and gender differences. T2DM is more frequently diagnosed at lower age and body mass index in men; however, the most prominent risk factor, which is obesity, is more common in women. Generally, large sex-ratio differences across countries are observed. Diversities in biology, culture, lifestyle, environment, and socioeconomic status impact differences between males and females in predisposition, development, and clinical presentation. Genetic effects and epigenetic mechanisms, nutritional factors and sedentary lifestyle affect risk and complications differently in both sexes.Growth of bacteria in the urine without any complaints (asymptomatic bacteriuria) is commonly detected in women up to 60 years, people with diabetes and in the elderly. It is not clear whether antibiotic treatment for this condition is of benefit for non-pregnant adults.[8-10]Hence; thepresent study was conducted for assessingantibiotic sensitivity pattern among diabetic females with asymptomatic bacteriuria.

Mean age of the patients was 56.7 years. Out of 200 subjects included, asymptomatic bacteriuria was seen in 40 subjects. Hence; the overall prevalence of asymptomatic bacteriuria among diabetic females was 20 percent. Among these 40 subjects, Escherichia coli, Klebsiella pneumonia, Coagulase negative

staphylococci and Staphylococcus aureus was seen on microbiological assessment in 55 %, 25 %, 7.5 % and 12.5 % of the patients respectively. E. coli was mainly resistant toCephalotin, Ceftriaxone, nalidixic acid and cotrimoxazole. Mageto VM et al determined the bacterial causative agents of urinary tract infections and their antibiotic resistance patterns.One hundred and eighty (180) type 2 diabetic patients were recruited to take part in the study. Urine samples were collected and cultured for urinary tract infections diagnosis and antibiotic sensitivity.A total of 35 isolates were obtained from the study. All the isolates were sensitive to gentamicin. All 21 (100%) isolates of E. coli were sensitive to gentamicin and cephalexin. All 10 (100%) K. pneumoniaeisolates were sensitive to gentamicin and nitrofurantoin. Out of the 21 E. coli isolates, five of them showed resistance to ampicillin, three E. coli isolates showed resistance to nitrofurantoin and another three E. coliisolates showed resistance to co-trimoxazole. Out of 10 K. pneumoniae isolates, two of them were found to be resistant to ampicillin, one K. pneumoniae isolate was resistant to cephalexin and two K. pneumoniaeisolates were resistant to co-trimoxazole. Out of the four P. mirabilis isolates, there were three cases where one isolate was each resistant to ampicillin, nitrofurantoin and co-trimoxazole.[9]

In the present study, Klebsiella pneumonia was mainly resistant to Ciprofloxacin, Cephalotin, Ceftriaxoneand ampicillin. Coagulase negative staphylococci was mainly resistant to Gentamicin, Ciprofloxacin and Cephalotin while staphylococcus aureus was mainly resistant to Ciprofloxacin and Erythromycin. Woldemariam HK et al, in another study, determined common uropathogens and antibiotic susceptibility patterns with associated risk factors among adult diabetic patients. The overall prevalence of uropathogens among diabetic patients was 56/248(22.6%) of which 21/177(11.9%) and 35/71(49.3%) had asymptomatic and symptomatic UTI respectively. E. coli 13/56(23.2%), Coagulase negative Staphylococci (CONs) 7/56(12.5%), Enterococcus Spp.6/56 (10.7%), Candida albicans 10/56(17.9%) and Non-albicans Candida Spp. 9/56(16.1%) were the commonest isolated uropathogens. In this study uropathogens were significantly associated with being type II diabetes patient and having previous UTI history. Both gram positive and gram negative bacteria showed resistance to most tested antibiotics. Drug resistance to two or more drugs was observed in 81.1% of bacterial isolates.[10]

CONCLUSION

Appropriate empirical therapy for AUB can be instituted timely on the basis of antipoetic sensitivity and resistance pattern.

REFERENCES

1. Wishner KL. Diabetes mellitus: its impact on women. Int J Fertil Menopausal Stud. 1996 Mar-Apr;41(2):177-86.
2. Cho N. H., Shaw J. E., Karuranga S., et al. IDF Diabetes Atlas: Global estimates of diabetes prevalence for 2017 and projections for 2045. Diabetes Research and Clinical Practice. 2018;138:271–281.
3. Yau J. W., Rogers S. L., Kawasaki R., et al. Global prevalence and major risk factors of diabetic retinopathy. Diabetes Care. 2012;35(3):556–564.
4. Hu Y., Teng W., Liu L., et al. Prevalence and risk factors of diabetes and diabetic retinopathy in Liaoning province, China: a population-based cross-sectional study. PLoS One. 2015;10(3, article e0121477)
5. Devillé WL, Yzermans JC, Van duijn NP, Bezemer PD, Van der windt DA, Bouter LM. The urine dipstick test useful to rule out infections. A meta-analysis of the accuracy. BMC Urol. 2004;4:4.
6. St john A, Boyd JC, Lowes AJ, Price CP. The use of urinary dipstick tests to exclude urinary tract infection: a systematic review of the literature. Am J Clin Pathol. 2006;126(3):428–36.
7. Faulkner CM, Cox HL, Williamson JC. Unique aspects of antimicrobial use in older adults. Clin Infect Dis. 2005;40(7):997–1004.
8. 16. Sugianli A, Ginting F, Kusumawati L, Pranggono E, Pasaribu A, Gronthoud F, Geerlings S, Parwati I, De Jong M, Leth F, Schultsz C. Antimicrobial resistance in uropathogens and appropriateness of empirical treatment: a population-based surveillance study in Indonesia. J Antimicr Chemo. 2017 May;72(5):1469–1477.
9. Mageto, V. M., Gatwiri, M. S., & Njoroge, W. (2018). Uropathogens antibiotic resistance patterns among type 2 diabetic patients in Kisii Teaching and Referral Hospital, Kenya. The Pan African medical journal, 30, 286. https://doi.org/10.11604/pamj.2018.30.286.15380
10. Woldemariam HK, Geleta DA, Tulu KD, Aber NA, Legese MH, Fenta GM, Ali I. Common uropathogens and their antibiotic susceptibility pattern among diabetic patients. BMC Infect Dis. 2019 Jan 10;19(1):43.