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ORIGINAL RESEARCH

EVALUATION OF ASYMPTOMATIC BACTERIURIA AND ANTIBIOTIC SENSITIVITY PATTERN AMONG DIABETIC FEMALES

[1]Dr. Vinita Bharti, [2]Devendra Kumar Katiyar

[1]Associate Professor, T.S.Misra Medical College & Hospital, Amausi, Lucknow, Uttar Pradesh, India

[2]Professor, Department of Pharmacology, KGMU, Lucknow, Uttar Pradesh, India

Correspondence:

Associate Professor, T.S.Misra Medical College & Hospital, Amausi, Lucknow, Uttar Pradesh, India

Email: vinitashivmani@gmail.com

Abstract

Background: The present study was conducted for assessing asymptomatic bacteriuria and antibiotic sensitivity pattern among diabetic females.

Materials & methods: 50 diabetic females were analyzed. Subjects with presence of known type two DM with a history of minimum of past 5 years were enrolled. Collection of Mid-stream urine samples was done and sent within one hour for processing. Microbiological profile was assessed. Antibiotic sensitivity pattern was also analyzed. Final results were analyzed by SPSS software.

Results: Staphylococcus aureus was found to be present in 20 percent of the patients. E. Coli was sensitive to Amikacin, Ciprofloxacin, Nalidixic acid and Cotrimoxazole while it was resistant to Vancomycin. K. pneumonia was sensitive to Amikacin, Ciprofloxacin, Ceftriaxone while it was resistant to Ampicillin. Staphylococcus aureus was sensitive to Amikacin, Ciprofloxacin and Vancomycin while it was resistant in Erythromycin.

Conclusion: On the basis of antibiotic sensitivity patterns of the commonly isolated pathogens, appropriate empirical therapy for AUB can be instituted timely to reduce complications.

Key words: Asymptomatic bacteriuria, Antibiotic sensitivity

Introduction

Diabetes mellitus (DM) is characterized by chronic hyperglycemia and impaired carbohydrates, lipids, and proteins metabolism caused by complete or partial insufficiency of insulin secretion and/or insulin action. There are two primary forms of diabetes, insulin-dependent diabetes mellitus (type 1 diabetes mellitus, T1DM) and non-insulin-dependent diabetes mellitus (type 2 diabetes mellitus, T2DM). T2DM is the most common form of DM, which accounts for 90% to 95% of all diabetic patients 1 and is expected to increase to 439 million by 2030.[1- 3]

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Asymptomatic bacteriuria (ABU) is the presence of bacteria in the properly collected urine of a patient that has no signs or symptoms of a urinary tract infection. Asymptomatic bacteriuria is very common in clinical practice. While few infants and toddlers have asymptomatic bacteriuria, the incidence increases with age. The incidence is up to 15% or greater in women and men age 65 to 80 years and as high as 40% to 50% after age 80. Most patients with asymptomatic bacteriuria will never develop symptomatic urinary tract infections and will have no adverse consequences from asymptomatic bacteriuria.[4- 6]Hence; the present study was conducted for assessing asymptomatic bacteriuria and antibiotic sensitivity pattern among diabetic females.

Materials & methods

The present study was conducted for assessing asymptomatic bacteriuria and antibiotic sensitivity pattern among diabetic females. 50 diabetic females were analyzed. Subjects with presence of known type two DM with a history of minimum of past 5 years were enrolled. Collection of Mid-stream urine samples was done and sent within one hour for processing. Microbiological profile was assessed. Antibiotic sensitivity pattern was also analyzed. Final results were analyzed by SPSS software.

Results

Mean age of the patients was 51.3 years. ABU was present in 20 percent of the patients (10 patients).E. coli and K. pneumonia were found to be present in 50 percent and 30 percent of the patients with ABU. Staphylococcus aureus was found to be present in 20 percent of the patients. E. Coli was sensitive to Amikacin, Ciprofloxacin, Nalidixic acid and Cotrimoxazole while it was resistant to Vancomycin. K. pneumonia was sensitive to Amikacin, Ciprofloxacin, Ceftriaxone while it was resistant to Ampicillin. Staphylococcus aureus was sensitive to Amikacin, Ciprofloxacin and Vancomycin while it was resistant in Erythromycin.

Table 1: Prevalence of ABU

Parameter	Number of patients	Percentage
Asymptomatic bacteriuria	10	20
Total patients	50	100

Table 2: Microbiological profile

Microbiological profile	Number of patients	Percentage of patients
Escherichia coli	5	50
Klebsiella pneumonia	3	30
Staphylococcus aureus	2	20
Total	10	100

Table 3: Antibiotic sensitive pattern

Microbiological profile	Escherichia coli (n=5)		Klebsiella pneumonia (n=3)		Staphylococcus aureus (n=2)	
	Sensitive	Resistant	Sensitive	Resistant	Sensitive	Resistant
Amikacin	3	2	2	1	2	0

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Ciprofloxacin	4	1	2	1	1	1
Ceftriaxone	1	4	2	1	1	1
Nalidixic acid	2	3	1	2	-	-
Cotrimoxazole	2	3	-	-	-	-
Erythromycin	-	-	-	-	0	2
Vancomycin	1	4	-	-	2	0
Ampicillin	-	-	0	3	1	1

Discussion

Type 2 Diabetes Mellitus (T2DM) is one of the most common metabolic disorders worldwide and its development is primarily caused by a combination of two main factors: defective insulin secretion by pancreatic β-cells and the inability of insulin-sensitive tissues to respond to insulin. Insulin release and action have to precisely meet the metabolic demand; hence, the molecular mechanisms involved in the synthesis and release of insulin, as well as the insulin response in tissues must be tightly regulated. Therefore, defects in any of the mechanisms involved can lead to a metabolic imbalance that leads to the pathogenesis of T2DM.[5-7]Asymptomatic bacteriuria (ASB) is defined as the presence of ≥105 CFU/ml of one or more bacterial species, irrespective of pyuria, in a urine specimen from a patient without signs or symptoms of a urinary tract infection (UTI). In men, one voided urine specimen meeting these criteria defines ASB. For women (including pregnant women), two consecutive voided urine specimens should be obtained, ideally within 2 weeks, with recovery of the same species at levels of $\geq 10^5$ CFU/ml to meet criteria for ASB. The United States Preventive Services Task Force (USPSTF) further adds that $>10^4$ CFU/ml is significant if the bacterium is group B Streptococcus in pregnant women. In men or women with indwelling catheters, bacteria present in a single catheterized urine specimen at quantities of $\geq 10^5$ CFU/ml are diagnostic of asymptomatic bacteriuria. Bacterial counts as low as $\geq 10^2$ CFU/ml also may be used for catheterized patients, but the clinical significance of counts this low has not been fully vetted in this population.[7-9]

Mean age of the patients was 51.3 years. ABU was present in 20 percent of the patients (10 patients).E. coli and K. pneumonia were found to be present in 50 percent and 30 percent of the patients with ABU. Staphylococcus aureus was found to be present in 20 percent of the patients. In a study conducted by Bharti A et al, authors determined the prevalence of ASB in patients with type 2 DM and assessed the spectrum of uro-pathogens causing ASB along with their antibiotic susceptibility profile.The study was conducted on 100 patients with type 2 DM. Urine wet mount and gram stain examination was done for all to detect the presence of pus cells and bacteria in urine.ASB was common among diabetics, as evident by a prevalence of 21%. Presence of ASB showed positive correlation with poor glycemic control. Escherichia coli (E. coli) was the most common organism causing ASB followed by Candida, Pseudomonas, Klebsiella, and Citrobacter. E. coli isolated from study patients was most sensitive to imipenem and nitrofurantoin (NFT).ASB is common among diabetics, with poor glycemic control being a significant risk factor. E. coli is the most common organism causing ASB in diabetics, and it is most sensitive to imipenem and NFT.[10]

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E. Coli was sensitive to Amikacin, Ciprofloxacin, Nalidixic acid and Cotrimoxazole while it was resistant to Vancomycin. K. pneumonia was sensitive to Amikacin, Ciprofloxacin, Ceftriaxone while it was resistant to Ampicillin. Staphylococcus aureus was sensitive to Amikacin, Ciprofloxacin and Vancomycin while it was resistant in Erythromycin.Bissong ME et al determined the prevalence and etiology of ASB and antimicrobial resistance of urinary isolates in diabetics and non-diabetics.The study involved a total of 265 participants including 154 diabetes mellitus patients and 111 non-diabetics. ASB was detected in 33.2% of participants; 38.3% in diabetics and 26.1% in non-diabetics (P = 0.03). Coagulase-negative staphylococci (CNS) were the predominant organisms (36.3%) isolated from urine in both diabetics and nondiabetics. Other isolates included Klebsiella sp (15.9%), Candida sp (13.7%), E. coli (10.8%) and Serratia sp (10.8%). Candida sp was isolated more from diabetics than non-diabetics (P = 0.01). There was no significant difference in resistance between diabetics and non-diabetics (P > 0.05). Most isolates showed multiple resistance and ciprofloxacin was the most active ingredient against bacterial uropathogens.The study revealed a high prevalence of ASB in diabetics than in non-diabetics.[11]

Conclusion

On the basis of available antibiotic sensitivity patterns of the commonly isolated pathogens, appropriate empirical therapy for AUB can be instituted timely to reduce complications.

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