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Prevalence of Asymptomatic Bacteriuria and Their Bacteriological Profile among Diabetic Male Patients Attending Our Diabetic Outpatient Department.

Raveendran SR[1], and Lakshmipriya R[2]*

[1]Madha Medical College & Hospital, Tamil Nadu, India.
[2]ESIC MC and PGIMSR, Chennai, Tamil Nadu, India.

ABSTRACT

Asymptomatic bacteriuria is common among diabetic individuals compared to non diabetic population, and so is more common among females due to the anatomic arrangement of the female urinary tract. This is a cross sectional study conducted in a medical college for a period of six months(January 2014 to June 2014) to evaluate the prevalence of asymptomatic bacteriuria among diabetic male population and the prevalence of commonest aerobic bacteria causing such infection. After getting informed consent from patients clean- catch mid stream urine were collected and the samples were processed in the central laboratory using standard microbiological techniques. The study population included 150 subjects out of which 19 (12.6%) subjects had ASB. *Escherichia coli* (42.1%) was the commonest organism isolated, followed by *Klebsiella pneumonia* (15.7%). The other organisms isolated were *Staphylococcus aureus* (10.5%), *Enterococci* spp (10.5%), Coagulase negative Staphylococcus (10.5%), *Pseudomonas* spp (5.2%). This study showed the prevalence of ASB was significant among diabetic population and they also developed symptomatic bacteriuria later.

Keywords: Asymptomatic bacteriuria, diabetes, male, bacteria

Corresponding author

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INTRODUCTION

Urinary tract infections (UTI) are most common infection among diabetic individuals. UTI is divided into symptomatic bacteriuria and asymptomatic bacteriuria [1]. Asymptomatic bacteriuria (ASB) is defined as "the presence of at least 10^5 colony forming units (CFU) / ml of one or two bacterial species in clean – voided midstream urine sample from an individual without any symptoms of urinary tract infection". The symptoms of urinary tract infection are dysuria, burning micturation, supra pubic pain, urgency, frequency, abdominal distension, fever [2].

The urinary tract is generally a sterile tract, but in diabetics the risk of acquiring infection of the urinary tract is high [3]. The diabetic females are more prone to UTI both symptomatic and asymptomatic bacteriuria when comapared to male population, because the anatomic arrangement of female urethra facilitates development of UTI like short urethra and other factors [4].

In diabetic individuals the host defense system undergoes several changes and it may result in infections especially of urinary tract. The changes may be effects of increased glucose content of urine which acts as a growth factor for uropathogens, increased adherence of microorganisms in epithelial cells of the urinary bladder, impaired granulocyte function and neuropathic bladder which may end up in impaired bladder emptying and result in infection [4,5]. Association between asymptomatic bacteriuria, control of blood sugar level and impairment of renal function has been advocated for long time [6,7].

Proper control of blood sugar levels is mandatory for prevention of infection. A short term insulin therapy can also be considered for control of diabetes. But regarding treatment of asymptomatic bacteriuria there are many contradictions. This is because there are not enough studies to prove treatment of ASB can prevent development of symptomatic UTI or prevent impairment in renal function. However pregnant women need to be treated for ASB irrespective of their diabetic status [8].

Global prevalence of ASB in diabetic female ranges from 9 - 27%, whereas in diabetic men it ranges from 0.7 -1 % (6,8). However in our study the prevalence in diabetic male poplation was as high as 12.6%. Control of diabetes is required to prevent UTI whether symptomatic or asymptomatic, so close monitoring of diabetic status is required. ASB poses more serious problems because of not identifying the condition and leading to complications of UTI like emphysematous cystitis, pyelonephritis, renal and perinephric abscess [3,5].

MATERIALS AND METHODS

This is a cross sectional study conducted in our hospital for a period of six months. A total of 150 subjects who attended diabetic outpatient department were included in the study population. Only diabetic male patients were included in the study after getting informed consent. Proper instructions were given regarding proper collection of clean catch mid-stream urine.

The collected samples were immediately sent to central laboratory. The macroscopic and microscopic examination of the urine sample was carried out. Uncentrifuged urine was then inoculated on to Mac Conkey medium and Nutrient medium by Standard loop technique and colony count was analysed using semi quantitative method of streaking in Mac Conkey medium.

The inoculated culture Medias were incubated at 37ºC in incubator for 24 to 48 hours aerobically. In positive cultures the colony were counted using hand lens. The number of colony forming units (CFU) was multiplied by 100 to obtain the number of microorganisms per milliliter in the original specimen. Urine culture that showed 10^5 CFU/ml was considered as significant bacteriuria.[9,10]

Interpretation of results [11]

Kass in 1956 had formulated a criterion of active bacterial infection of urinary tract. Significant bacteriuria: colony count > 10^5 CFU/ml of one or two bacterial species. Doubtful significance: colony count between 10^4 to 10^5 CFU/ml of urine, insignificant growth colony count less than 10^4.

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The bacteria isolated were subjected to standard biochemical tests and identified. Antiobiotic susceptibility testing was done on Mueller Hinton Agar using Kirby Bauer Disc diffusion method.

Albumin excretion was measured in 24 hour urine sample and they were categorized as normoalbuminuria if values were less than 30mg/24h, microalbumunuria when value was 30 to 300 mg/24h, macroalbuminuria when values were above 300mg/24h.

RESULTS

A total of 150 samples were collected from diabetic male patients attending diabetic outpatient department. Urine analysis for presence of pus cells and bacteria were done. Urine culture and antibiotic susceptibility testing was done for all the samples.

Table 1: prevalence of bacterial organism causing ASB in diabetic male population

S:no	Bacterial isolate	Prevalence (%)
1	*Escherichia coli*	42.1
2	*Klebsiella* spp	15.78
3	*Staphylococcus aureus*	10.5
4	Coagulase negative Staphylococcus	10.5
5	*Pseudomonas* spp	5.2
6	*Enterococcus* spp	10.5
7	*Citrobacter* spp	5.2

Out of 150 samples 19 (12.6%) samples showed significant bacteriuria. The most common organism isolated was *Escherichia coli* (42.1%) in 7 diabetic male subjects. Following it were *Klebsiella* spp (15.78%) in 3 patients, *Staphylococcus aureus* (10.5%) in 2 patients, Coagulase negative Staphylococcus (10.5%) in 2 patients, *Pesudomonas* spp (5.2%) in 1 patient, *Enterococcus* spp (10.5%) in 2 patients, *Citrobacter* spp (5.2%) in 1 patient.

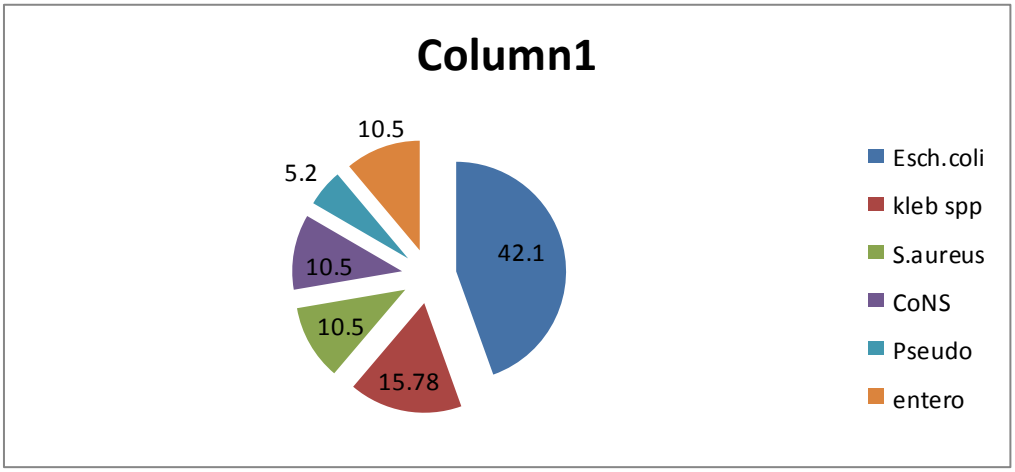

Figure 1: prevalence of bacterial organism causing ASB in diabetic male population

Albumin excretion was estimated by analyzing 24 hour urine sample. 12.9% of the diabetic male population showed albuminuria.

DISCUSSION

Association between ASB and diabetes has been known for a long time. Many studies have been conducted to know the association of ASB and diabetes in female patients. But few studies have been conducted to know the association among male diabetic population.

The present cross sectional study was conducted to know the prevalence of ASB among diabetic male population and to know the commonest bacterial organism causing ASB.The global prevalence of ASB among diabetic male population ranges from 0.7 – 1%. But in our study the prevalence was as high as 12.6% (8). This

may be due to the fact that most of the patients had uncontrolled diabetes and was on irregular treatment because of their socio economic status and lack of awareness towards the disease nature.

Prevalence of ASB is usually about 3 times higher in diabetic population compared to non diabetic population. This is because of the fact that there is metabolic derangement, impaired granulocyte function, neuropathic bladder, increased adherence of bacterial organism to bladder epithelial cells and increased glucose content of urine [6,7].

In this study the most common organism isolated was *Escherichia coli* (42.1%) following which it was *Klebsiella* spp (15.78%), *S.aureus* (10.5%), *Enterococcus* spp (10.5%), Coagulase negative Staphylococcus (10.5%). This correlates with many studies like Lyce WC et al (11), Patterson et al [12].

The patients with ASB eventually developed symptomatic UTI sooner or later. And most of them also had previous history of recurrent UTI. These findings suggest that diabetic population are prone to recurrent UTI and symptomatic UTI following ASB due to many factors mentioned earlier.

Since untreated ASB may lead to complications like emphysematous cystitis, pyelonephritis, renal and parenchymal abscess and also impairment of renal function it is necessary to treat ASB and also have strict control over diabetic status of the individuals to ensure recovery and prevent complications.

CONCLUSION

To conclude, in this study the prevalence rate of ASB among diabetic male population was 12.6% which is statistically significant. Diagnosis of ASB is difficult as these patients do not show any symptoms of UTI but the complications of UTI occur in ASB also. So early detection and prompt treatment is required to prevent complications of UTI. Urine culture and sensitivity is gold standard method for diagnosis of ASB, hence it is advocated to do urine culture and sensitivity in diabetic patients on a regular basis. Also uncontrolled diabetes is the major cause of ASB; therefore strict control of blood glucose levels help in reducing the occurrence of ASB and thereby preventing its complications.

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