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PREVALANCE OF ASYMPTOMTOMATIC URINARY TRACT INFECTION AMONG DIABETIC PATIENTS AT A TERTIARY CARE CENTRE IN NORTH INDIA

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ABSTRACT

The commonest infection associated with Diabetes mellitus is urinary tract infection, but many times UTI is symptomless and hence may go undiagnosed. In the present study, 125 midstream urine samples from diagnosed cases of DM were examined. Significant asymptomatic bacteriuria was detected in 40% of diabetic patients. Based on the present study pyuria, duration of diabetes, catheterization and glucosuria are the risk factors for asymptomatic UTI in patients with diabetes mellitus. Routine cultures must be recommended for those who show no urinary symptoms but who have one or more risk factors, identified in the study.

KEYWORDS: Diabetes mellitus, Urinary Tract Infection, Asymptomatic UTI.

INTRODUCTION

Diabetes mellitus (DM) is thought to be a disease of developed countries but astonishingly 8% Indians are suffering from it. This slow killer drag many infections along with it, the commonest being urinary tract infection (UTI).[4] Unfortunately many a times UTI can be symptomless (asymptomatic Urinary Tract Infection) thus goes undiagnosed. Long standing diabetes in conjunction with prolong catheterization, old age, hypertension, prostatic syndrome, tuberculosis are more prone to ASB. ASB poses a major health threat to the patients instigating recurrent UTI, furthermore complications viz. emphysematou cystitis, pyelonephritis, perinephric and renal abscess etc. ultimately leads to fatal conditions like bacteremia and renal failure.[2] The study was planned in a rural set up as most of the patients are illiterate & visit the hospital when they land up in severe conditions. Hence periodical and routine urine cultures and antibiotic sensitivity testing should be recommended for all diabetics, more so in elderly and those with risk factors for asymptomatic urinary tract infection in order to prevent complications.

MATERIAL AND METHODS

The study was carried out in the Department of Microbiology of a Government, tertiary care hospital in North India. A total of 125 midstream urine samples were collected by clean catch technique in a wide mouthed plastic universal container from diagnosed cases of DM. Samples were processed within one hour of collection by inoculating on Cysteine Lactose Electrolyte Deficient (CLED) agar and incubated at 37^0C for 18 hours. Culture plates were examined; isolates were identified by standard laboratory protocols & subjected to Antibiotic Sensitivity Testing (AST) as per Clinical Laboratory Standards Institute (CLSI) guidelines. Ethical clearance was taken from the concerned committee.

RESULTS

In the present study out of 125 midstream urine samples, the rate of detection of culture positive cases was 40% (Table 1). The diseases associated with asymptomatic UTI in diabetics were predominantly hypertension (40%), Chronic Renal Disease (32%), prostatic syndrome (18%) and tuberculosis (12%) (Table 2). Predisposing factors for asymptomatic UTI in diabetes mellitus patients were, predominantly duration of diabetes > 5 yrs. (70%), patients undergoing hemodialysis (24%) and long term catheterized patients (75%) (Table 3). Peripheral neuropathy (12%) was the major factor for higher incidence of UTI in diabetic patients, followed by diabetic nephropathy (8%) and macro vascular diseases (4%) (Table 4).

Out of the total bacterial isolates 46% were gram negative and 36% were gram positive, there were 18% of candida species (Table 5).It was seen that diabetic females were majorly culture positive i.e. 62% hence,

showing predilection towards asymptomatic UTI (Table 6). Maximum numbers of patients were in the age group of 35 to 50 yrs. (56%) (Table 7), followed by 51-65 yrs. (36%) and then 66-80yrs (8%).

Table I: Rate of isolation of Uropathogens from DM patients with asymptomatic UTI.

Total	Culture Positive	No growth
125	50(40%)	75(60%)

Table II: Correlation of diseases associated in DM patients with asymptomatic UTI.

Clinical presentation	Asymptomatic UTI
Hypertension	20(40%)
Chronic kidney disease	16(32%)
Prostatic syndrome	9(18%)
Tuberculosis	6(12%)
Genital tract infection	9(18%)

Table III: Predisposing factors for Asymptomatic UTI in DM patients.

Risk factor		Asymptomatic UTI	
		Total	Positive
Duration of DM	>5 yrs	50	37(75%)
	<5yrs	50	15(30%)
Patient undergoing hemodialysis		50	12(24%)
Catheter	Long term	8	6(75%)
	Short term	8	2(25%)

Table IV: Various factors leading to higher incidence of UTI in diabetes.

Complications	No. of positive cases
Peripheral neuropathy	12%
Diabetic nephropathy	8%
Macrovascular disease	4%

Table V: Detection of uropathogenes from DM patients with Asymptomatic UTI by gram staining.

Total no. of isolates	Gram positive isolates		Gram negative isolates
	Bacteria	Candida species	
50	18(36%)	9(18%)	23(46%)

Table VI: Gender wise distribution of dietetic patient with Asymptomatic UTI.

Males	19(38%)
Females	31(62%)

Table VII: Age wise distribution of DM with Asymptomatic UTI.

Age (years)	Total	Percentage (%)
35-50	28	56%
51-65	18	36%
66-80	4	8%
Total	50	40%

DISCUSSION

In the current study, asymptomatic UTI was detected in 40% cases of DM. It is comparable with Makuyana et al.[3] who reported 32% while Yeshitela et al.[4] reported 10.4%, G.Sibi et al.[5] 68% and Vishal Sharma et al.[6] 50.84%. The variations in percentages of asymptomatic UTI have been attributed to factors such as geographical background, traditional variation of subjects and difference in the screening test.

Important factors contributing to DM are life style and genetic factors, also abnormalities of platelet function, coagulation and lipoprotein abnormalities, alterations in vascular endothelium same are for hypertension. In present study, Hypertension (40%) was the commonest disease, associated with asymptomatic UTI in DM patients, which is inconcordance with Ruby Meiland et al (54%).[7] Jee hoon et al.[8] reported that men suffering from diabetes have larger prostate glands than men without these disorders suggesting that hyperinsulinemia may be related to prostate enlargement, attributable to residual urine in the bladder leading to UTI. In the present study prostatic syndrome (18%) was associated with asymptomatic UTI. Which was in accordance with M.C.Ribera et al.(64.7%).[9]

Chronic renal disease patients with underlying diabetes are specifically at risk. In present study 32% of patients were having chronic renal disease, in concordance with Forland et al.,[10] they investigated the localisation of infection in the renal tract of diabetic subjects and found 19% of women and 2% of men to have UTI.

Gizachew et al.[11] reported that 52% of DM patients develop asymptomatic UTI within 5 years duration of diabetes. In concurrence with the current study, duration of diabetes is one of the major risk factor in development of asymptomatic UTI, 70% of diabetics for more than 5 years develop asymptomatic UTI. Similarly Hale Turan et al.[21] and Suzanne e. Geerling at al.[13] found that there was statistically significant relation between duration of diabetes and asymptomatic UTI. Thus the above mentioned findings state the fact that susceptibility of asymptomatic UTI increases with longer duration and severity of diabetes.

As both uraemia and dialysis can complicate glycaemic control by affecting the secretion, clearance and peripheral tissue sensitivity of insulin. Haemodialysis is another risk of developing asymptomatic UTI. In the current study 24% of patients who were undergoing

haemodialysis were having asymptomatic UTI in accordance with B.D.Sharma et al (28%).[14]

Another predisposing factor for asymptomatic UTI in the present study was catheterisation, long term catheterised (75%) patients with asymptomatic UTI while short term catheterization (25%) in concordance with B.D.Sharma et al.[14] reported 100% in long term catheterised patients whereas range to 9-23% only in short term patients. The risk of UTI increases with increased duration of catheterisation. The urethral catheter can inhibit or bypass some defence mechanisms which would normally prevent or minimise bacteria-epithelial cell interactions.

Peripheral neuropathy is amongst the various complications that pose a threat of developing asymptomatic UTI in diabetic patients. In current study 12% of diabetic patients who were having peripheral neuropathy developed asymptomatic UTI. Suzanne e. Geerlings et al.[13] supported the result, 40% of their patients developed asymptomatic UTI which is due to diabetic microvascular injury involving small blood vessels that supply nerves vasa nervorum in addition to macrovascular conditions that can culminate in diabetic neuropathy. Damage to bladder nerves can prevent emptying completely allowing bacteria to multiply in bladder and kidneys, leading to UTI.

Peripheral neuropathy was followed by diabetic nephropathy as another complication leading to UTI. In the present study 8% of such patients develop asymptomatic UTI. This was in accordance with the study done by Korzeniowski et al.,[15] it states that prevalence of UTI in diabetic neuropathy was 13% which may be due to prolonged hyperglycaemia, insulin resistance, macrovascular disease and hypertension, these play major roles in development of neuropathy.

Female preponderance (62%) was seen in the present study consistent with the findings of Ophori et al.,[16] 72.34% were females. The high prevalence of UTI among female population may be due to short and wide urethra and proximity to anus.

In the present study, the youngest patient was of 35yrs, while the oldest was 80 yrs. Maximum number of patients were in the age group of 35 to 50 yrs. (56%) supported by Opheri et al.[16] who showed that the frequency of asymptomatic UTI is more in the age group of 35 to 80(68.1%) followed by patients more than 50 yrs. (23.4%) Gizachew Yismaw et al.[11] showed that majority (40.8%) of patients were between 36 to 55 years age group. This may be because it is the sexually active age group. Sexual intercourse introduces bacteria into a women's urinary tract. During intercourse the urethra comes into contact with bacteria from the genital area and anus, allowing them to enter the urethra, the bladder and possibly eventually the kidneys and resulting in an infection.

CONCLUSION

To summarize, a high prevalence of asymptomatic UTI was established in both males and females and is of major public health importance. The prevalence of asymptomatic UTI is higher in females (62%) than in males. Routine urine cultures should be recommended for diabetic women even when there are no urinary symptoms. Significant asymptomatic bacteriuria was detected in 40% of diabetic patients, UTI in asymptomatic patients should not be neglected and follow up studies are required to supplement the present findings for appropriate management of asymptomatic UTI's in diabetic patients.

Asymptomatic UTI is common, especially in functionally impaired elderly patients with multiple medical comorbidities like hypertension, prostatic syndrome and tuberculosis. Early recognition and management of various risk factors of asymptomatic UTI is very important to potentially reduce its occurrence. Long standing diabetics and long term catheterized patients were prone for development of asymptomatic UTI.

Based on the present study pyuria, duration of diabetes, catheterization and glucosuria are the risk factors for asymptomatic UTI in patients with diabetes mellitus. Routine cultures must be recommended for those who show no urinary symptoms but who have one or more risk factors, identified in the study.

Hence, periodical urine cultures should be taken from diabetic patients older than 35 years to detect asymptomatic UTI early on and to prevent its development or persistence. Further studies need to be done to assess the prevalence of asymptomatic bacteriuria in diabetic women and also assess their antimicrobial sensitivity pattern. Long term follow up should also be implemented for diabetic patients with asymptomatic UTI so that the precise conclusions could be drawn regarding the course of UTI development in future.

BIBLIOGRAPHY

1. Patterson JE, Andriole VT. Bacterial urinary tract infections in diabetics. Infect Dis Clin North Am, 1997; 11: 735-50.
2. Kunin CM. Detection, prevention and management of UTI, 4th ed. Philadelphia, PA: Lea and febiger, 1987: 447.
3. Makuyana D, Mhlabi D, Chipfupa M, Munyombwe T, Gwanzura L. Asymptomatic bacteriurea among outpatients with diabetes mellitus in an urbam black population. Cent Afr J Med., 2002; 48(7-8): 78-82.
4. Yeshitela B, Gebre-Selassie S, Feleke Y. Asymptomatic bacteriuria and symptomatic urinary tract infections (UTI) in patients with diabeties mellitus in Tikur Anbessa Specialised University

Hospital, Addis Ababa, Ethiopia. Ethiop Med J., 2012; 50(3): 239-49.

5. Sibi G, Devi AB, Fouzia K, Patil BR. Prevalence, Microbiologic Profile of Urinary Tract Infection and its Treatment with Trimethoprim in Diabetic Patients. Research Journal of Microbiology, 2011; 6: 543-51.

6. Sharma V, Gupta V, Mittal M. Prevalence of Uropathogens in Diabetic Patients and Their Antimicrobial Susceptibility Pattern. National Journal of Laboratory Medicine, 2012; 1(1): 26-28.

7. Meiland R, Geerlings SE, Stolk RB, Netten PM, Schneeberger PM, Hoepelman AI. Asymptomatic bacteriuria in women with diabetes mellitus: Effect on renal function after 6 years of follow up. Arch Intern Med., 2006 Nov 13; 166(20): 2222-7.

8. Jeong JH, Kim ET, Kim DK. Association of metabolic syndrome and benign prostatic enlargement in young Korean males. Korean J Urol., 2011; 52(11): 757-62.

9. Ribera MC, Pascual R, Orozco D, Perez Barba C, Pedrera V, Gil V. Incidence and risk factors associated with urinary tract infection in diabetic patients with and without asymptomatic bacteriuria. Eur J Clin Microbiol Infect Dis., 2006; 25(6): 389-93.

10. Forland M, Thomas V, Shelokov A. Urinary tract infections in patients with diabetes mellitus. Studies on antibody coating of bacteria. JAMA, 1977; 238(18): 1924-26.

11. Yismaw G, Asrat D, Woldeamanual Y, Unakal CG. Urinary tract infection: bacterial etiologies, drug resistance profile and associated risk factors in diabetic patients attending Gondar University Hospital, Gondar, Ethiopia. European Journal of Experimental Biology, 2012; 2(4): 889-898.

12. Turan H, Serefhanoglu K, Torum AN, Kulaksizoglu M, Pamuk B, Arslan H. Frequency, risk factors, and responsible pathogenenic microorganisms of asymptomatic bacteriuria in patients with type 2 diabetes mellitus. Jpn Infect Dis., 2008; 61(3): 236-8.

13. Geerlings SE, Stolk RP, Camps MJ, Netten PM, Hoekstra JB, Bouter KP, Bravenboer B, Collet JT, Jansz AR, Hoepelman AL. Asymptomatic.

14. Sharma B.D, Bansal R, Gupta B, Asymptomatic bacteriuria in diabetics. JIACM, 2011; 13(1): 55-56.

15. Korzeniowski OM, Urinary tract infection in the impaired host. Med Clin North Am, 1991; 75(2): 391-404.

16. Ophori EA, Imade P, Johnny EJ, Asymptomatic bacteriuria in patients with type -2 diabetes mellitus. J Bacterio, Res., 2010; 2(2): 14-17.