Original Article

Urinary Tract Infection is the Most Common Complication in Diabetic Patients

1. Muhammad Ayoob Jalbani 2. Tufail Ahmed Pechuho 3. Saboor Ahmed 4. Rasheed Ahmed

1. Asstt. Prof., Surgical Unit-I, CMC, Larkana 2. Asstt. Prof. of Urology, GMMMC, Sukkur 3. Asstt. Prof. GMMMC, Sukkur 4. Prof. of Urology, GMMMC, Sukkur

ABSTRACT

Objective: The urinary tract infection are more frequent complications in patients with diabetes mellitus.
Study Design: Experimental Study.
Place and Duration of Study: This study was conducted at GMMMC Hospital, Sukkur, Pakistan from April 2008 to July 2009.
Materials and Methods: The patients which were selected in study all were more than 20years of age, of either gender were known diabetes for more than 3 years duration. The infection was labeled when >5/hpf leukocyte in urine and growth of organism on urine for C/S. The blood sugar and hemoglobin A1C (HbA1C) was also advised to evaluate the status of their diabetes i.e. control or poorly control.
Results: in this study total 200 diabetic patients were evaluated for urinary tract infection, of which 142(71%) had UTI. Out of 142 patients 130(91%) had diabetes type 2 and 12(8.4%) were diabetes type 1. The male to female ratio was 1:2. The age of patients with type 2 and type 1 diabetes mellitus was 50.52±9.74 and 18.77±2.65 whereas the mean random blood sugar level in patients with type 2 and 1 diabetes was 240 and 290. The duration of diabetes type 2 and 1 was 3.80±2.31 and 2.54±1.42. The isolated microorganism were Staphylococcus aureus, Escherichia coli, Proteus, Pseudomonas aeruginosa, Klebsiella, Enterobacteriaceae and C.albicans.
Conclusion: The urinary tract infection is more common complication in patients with diabetes mellitus.

Key Words: Pseudomonas aeruginosa, Klebsiella, Enterobacteriaceae, C.albicans, neurogenic, pyelonephritis

INTRODUCTION

Diabetes Mellitus is a chronic disease that can cause another serious health complications such as heart disease, kidney failure, stroke, and even blindness. Diabetes mellitus is also a condition where the pancreas not able to produces insulin in its proper amount. In this condition in which glucose, often mentions as blood sugar, is too high and could not be controlled. Glucose is made in the liver and muscle but mostly comes from the food we eat. In order to use this sugar, the pancreas produces a hormone called insulin. Urinary Tract Infection, (UTI) is a common ailment and can affect people of all ages, sex, and from all cultures. However, there are certain groups of people that are more prone to UTI than others. Women, for example, for reasons yet to be firmly established, carry a greater risk of UTI. Diabetic patients too fall under this category. Going further, pregnant women with diabetes are probably amongst the most vulnerable to UTI. Diabetic women are at a higher risk of developing to urinary tract infection (UTI) after menopause as compared to non-diabetic women. In fact, a study by University of Washington, Seattle revealed that the risk of UTI in diabetic women was 80% higher than others. UTI in diabetic patients is not only more severe but also is more recurrent as compared to non-diabetic patients. The sugar content of urine in a diabetic patient provides a breeding ground for bacteria once they enter the bladder. The most serious but rare types of UTI like pyelonephritis, widespread infections, abscesses, inflammation of the bladder wall, occur mostly in diabetic individuals. The risk of UTI increases with any negative change in the immune system of the body. Diabetes, like many other disorders, affects the immune system, increasing the risk of a urinary tract infection. Another characteristic of UTI in diabetic patients is that of the risk of presence of asymptomatic (having no symptoms of illness or disease) bacteriuria - presence of bacteria in urine - is much greater than in others. Treating this condition, according to study conducted in 2003, is of little value as it does not prevent complications. Diabetes may cause conditions of overactive bladder or neurogenic bladder. Whereas, an overactive bladder is common, neurogenic bladder is rare but more a severe condition. Diabetic men and women commonly face problems like feeling of urinary urgency, incontinence, frequency and getting up at night often to urinate. A severe condition often manifests in the shape of painful urination and retention of urine in the bladder.

UTI in diabetic patients can be a traumatic experience leading to complications if not treated in time. Urinary tract infection cure for diabetic patients requires a longer period, lasting from anything between seven to fourteen days, of antibiotic treatment even for uncomplicated infections. In many cases it may have to be accompanied by bladder infection treatment. This study concerned with evaluation of urinary tract infection in patients with diabetes mellitus.

MATERIALS AND METHODS

This descriptive case series study was carried out in the department of Urolody at GMMMC Hospital Sukkur, Pakistan, from april 2008 to July 2009. Patients were more than 20 years of age, of either gender were known diabetes for than 3years duration presented with fever with chills & rigor, burning during urination, altered colour of urine with foul smelling discharge, urgency to void, blood in the urine, discomfort in lower abdomen (supra pubic pain and flank pain) with nausea and vomiting, through outdoor & indoor patients in our study. The detail history of all such patients was taken; complete clinical examination and routine investigations were performed. The blood sugar and hemoglobin A1C (HbA1C) was also advised to evaluate the status of their diabetes i.e. control or poorly control.Urine microscopy were done in these patients to evaluate UTI the method for quantitating the number of leucocytes in the urine was glass slide microscopy. The infection labeled when >5/hpf leukocytes in urine, growth of organism on urine culture and sensitivity (C/S) by collecting urine sample in sterilize bottle, labeled it and sent to laboratory for analysis. The data was collected through a pre-formed performa / questionnaire.The frequency and percentage of for age & UTI and associated pathogens was calculated. The chi square test was applied on categorical variables and the p-values ≤ 0.05 was considered as significant.

RESULTS

During study period total 200 diabetic patients were evaluated for urinary tract infection, Out of 200, 142(71%) had detected urinary tract infection. Of 142 patients 130(91%) had diabetes type 2 and 12(8.4%) were diabetes type 1. The gender distribution in relation to urinary tract infection is shown in Table-I.

Table No.1:Gender distribution of patients with UTI

gender		UTI	Total	pValue
	positive	negative		
male	30(28.5%)	27(72.9%)	57(40.1%)	
female	75(71.4%)	10(27%)	85(59.8%)	0.03
total	105(73.9)	37(26%)	142(100%)	

Table No.2: Pathogens identified on culture & sensitivity

pathogens	n=92%
E.coli	58(65%)
proteus	12(13%)
staphylococcus aureus	11(12%)
psuedomonas aeruginosa	4(5%)
klabisella	03(3%)
entrobactericaea	02(2%)
c.albicans	02(2%)

The mean ± SD for age of patients with type 2 and type 1 diabetes mellitus was 50.52 ± 9.74 and 18.77 ± 2.65. The mean random blood sugar level in patients with type 2 and 1 diabetes was 240 and 290. The mean ± SD for duration of diabetes type 2 and 1 was 43.80 ± 2.31 and 2.54 ± 1.42. The isolated microorganism as far as diabetes is concerned are shown in Table II. Regarding the demographical distribution majority of the patients were from rural communities.

DISCUSSION

Urinary tract infections (UTIs) are a common burden in patients with diabetes mellitus. Cystitis, ascending infections leading to pyelonephritis, emphysematous complications and renal and perinephric abscesses are well recognised in this group of patients especially if glycaemic control is poor. Despite the clinical significance of UTI in diabetes, it is inadequately understood and management regimens are mostly not evidence based. Anticipation of potential complications and earlier interventions are vital to reduce serious adverse outcomes. Herein we discuss the aetiology, pathogenesis and management of UTI and its local and more remote complications.

In present study the reported prevalence patients of urinary tract infection in diabetes was 71% of which 91% in diabetes type 2 and 8.4% in diabetes type 1 and it can be compared with the study of Lerman-Garber et al7 which shows that overall prevalence was 46.5% (slightly lower than our study) and proved the association of urinary tract infection and diabetes. The finding of present study can be comparable with the study of Patel, et al,8 which was a 14 years prospective study, about the complications of urinary tract infection, done on 8793 hospitalized cases. He has reported acute complications, and chronic urinary tract infection in 31.4% of patients with diabetes mellitus. In our study the female population was predominant to acquire urinary tract infection and is consistent with the study by Brauner et al9. In our study 71% patients had poor glcaemic control and Brauner et al hypothesized that good glycaemic control helps in reducing the prevalence of urinary tract infection. Bacteriological studies usually reveal the involvement of gram negative enteric organisms that commonly causes urinary tract infections such as E. coli, Klebsiella species, and the Proteus species10. Similarly, the predominant numbers of pathogens isolated in our study were gram negative bacilli. Among the patients infected with gram negative bacilli in our study, Escherichia coli was isolated from 58(63%) of the subjects, Klebsiella spp. From 03(03%), Pseudomonas spp. from 04(05%), Staph aureus 11(12%) and the Proteus spp in 12(13%) and can be contrast with the study by Brauner et al9 reported prevalence of E.coli 55% of urine culture in diabetic patients. Hoepelman suggested mechanisms of an increased susceptibility to UTI are (a) decreased

antibacterial activity due to the 'sweet urine', (b) defects in neutrophil function (c) increased adherence to uroephithelial cells and UTI in diabetics should be treated complicated UTI with agents reaching high tissue levels for 10–14 days11. The diabetes severity and duration are the main determinants of higher UTI and asymptomatic bacteriuria risk-a pattern that resembles the relation between diabetes characteristics and other complications, such as retinopathy or neuropathy Therefore, one would expect that improved diabetes control might yield a reduction in incidence of urinary tract infection.

CONCLUSION

The urinary tract infection is more prevalent in patients with persistent raised blood glucose level or poorly glycaemic control while E.coli is the main cause for UTI in patients with diabetes mellitus.

REFERENCES

1. American Diabetes Association: Diagnosis and classification of diabetes Mellitus. Diabetes Care. Leukocyturia in women with diabetes and its clinical 2005; Suppl 1:537-42.
2. Shera AS, Jawad F, Maqsood A. Prevalence of diabetes in Pakistan. Diabetes Res Clini Pract 2007;76(2):219-22.
3. Muller LMA J, Gorter KJ, Hak E, Goudzwaard WL, Schellevis FG, Hoepelman AIM, et al. Increased Risk of Common Infections in Patients with Type 1 and Type 2 Diabetes Mellitus. Clin Infect Dis 2005;41: 3: 281-8.
4. Patterson JE, Andriole VT. Bacterial urinary tract infections in diabetes. Infect Dis Clin North Am 1997;11:735–50.
5. Valerius NH, Eff C, Hansen NE, et al. Neutrophil and lymphocyte function in patients with diabetes mellitus. Acta Med Scand 1982;211:463–7.
6. Tahir N, Uddin QT. Frequency of urinary tract infection in diabetic females. KUST Med J 2009; 1(2): 55-58.
7. Lerman-Garber I, Calva-Mercado JJ, Martínez-Sibaja C, classification of diabetes Mellitus. del Castillo CF, Sánchez Javier RM, Lara E, et al. Leukocyturia in women with diabetes and its clinical implications. Arch Med Res 2000;31(2): 210-5.
8. Petel JC. Complications in 8793 cases of diabetes mellitus 14 years study in BombaymIndia. Indian Med Sci 1989; 43(7): 177-83.
9. Brauner A, Foldin U, Hylander B, Ostenson CG. Bacteriuria, bacterial virulence and host factors in diabetic patients. Diabet Med 1993; 10(6): 550-4.
10. Bova JG, Potter JL, Arevalos E, Hopens T, Goldstein HM 1997;11:735–50. Radwin HM. Renal and perirenal infection: t0 he role of computerized tomography. J Urol 1985;133:375-8.
11. Hoepelman. Urinary tract infection in patients with diabetes mellitus. International J Antimicrobial of Science Agents 1994;4(2):113-16.

Address for Corresponding Author:
Dr. Tufail Ahmed Pechuho,
Asstt. Prof. of Urology,
GMMMC, Sukkur
Cell No.0301-3482013