

Original Article

Asymptomatic Urinary tract infection among diabetic patients admitted at a tertiary care hospital of Karachi

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Abstract

Objective To determine frequency of urinary tract infection among asymptomatic diabetics, the etiological agents, antibiotic sensitivity and the pattern of antibiotic resistance to that organism. **Methodology** This cross-sectional study was conducted at Taj Medical Complex, Hamdard University Hospital, and Karachi. A total of 395 patients with Diabetes Mellitus were enrolled in our study. All data were transformed in a structured Performa. All lab analysis plus Urine C/S were done with written consent from the patients. Data was maintained and analyzed on SPSS version 20. **Result** Among the 395 included patients, 44 % (174) were females and 56 % (221) were males. 362 were taking oral hypoglycemic agents (OHA), 9 were under insulin and 24 were taking both insulin and OHA. The mean HbA1c was 8.08 ± 1.29 . Out of 395 samples of urine C/S of asymptomatic diabetic patients, 242 samples showed growth of organisms more than 10^5 CFU (colony forming units). The most common organism in 160 (66.11%) cases was E.coli. The other organisms isolated were klebsiella in 37 (15.28%) cases, staph aureus in 30 (12.4%), proteus in 7 (2.3%), enterococcus in 8 (3.3%) case. UTI was found more common in those patients who were taking oral hypoglycemic agents as compared to those who were taking insulin. E.coli- was sensitive to ciprofloxacin in 88.75%, ceftriaxone in 67.9% and imipenem in 100%. Klebsiella was 100% sensitive to ciprofloxacin. It was also 100% sensitive to imipenem. Staph aureus was sensitive to ciprofloxacin in 70%cases and 77% sensitive to ampicillin. E.coli was resistant to ampicillin, cefixime and gentamycin. Klebsiella was resistant to ceftriaxone and pimperidic acid. Staph aureus was resistant to co-trimoxazole. Proteus was resistant to imipenem in 100% cases and enterococci were resistant to amikacin in 100% cases. **Conclusion** The study concluded that the prevalence of UTI is higher in females as compared to males in asymptomatic diabetic patients. E.coli was the foremost etiological agent of UTI. It was also observed that the diseases incidence increases with increasing age and vice versa. Because of the frequency and severity of UTI in diabetes, prompt diagnosis and early treatment is compulsory to prevent consequent complications.

Keywords

Diabetes, Urinary tract infection, antibiotic, resistance, insulin, oral hypoglycemic agents.

Introduction

Over the last two decades, the global incidence of Diabetes has raised significantly¹. Asia is considered as the fastest continent in terms of growing number of people with diabetes with India, China, Pakistan and Japan having higher rates among rest of the countries in Asia. The World Health Organization (WHO)

predicted that, the number of people with diabetes in Asia will almost be doubled in the next 20 years². The incidence of diabetes is high in Pakistan as reported in earlier three surveys conducted in the province of Sindh, having 13.9%, and other provinces³. Patients with known DM have a higher rate of Urinary Tract Infection (UTI)

compared to those patients who are non-diabetics. The patients who are having burning micturition and lower urinary tract symptoms and diagnosed bacteriuria in urine C/S with DM are in serious situation and needs proper clinical attention for early diagnosis and prompt treatment. UTI in patients having diabetes are mostly considered as complex⁴. Most patients have long term diabetes have asymptomatic UTI which can be diagnosed on routine urine D/R and C/S as incidental finding⁵. This asymptomatic infection in diabetic patients can lead to rigorous renal injury and renal failure⁶.

The increased incidence of patients having asymptomatic bacteriuria and symptomatic Urinary tract infection in diabetics may be the effect of divergence in host responses between patients who have diabetes and patients who do not have diabetes or to a variance in infecting bacterium itself⁷. The presentations of patients who are having Urinary tract infection with diabetes are capricious. Fever may be present, occasionally. Hematuria or flank pain present due to sloughing papillae may be noted in patients with papillary necrosis. Diabetic patients with urinary tract infection may be the source of metastatic infection. On the other hand poor diabetes control causes frequent urinary tract infection. Most of the studies have shown the presence of colony count of >10⁵ organism per milliliter from properly collected midstream clean-catch sample to be significant. In diabetic patients screening for UTI is very important to enable it to be properly treated and to prevent the development of possible complications. This study aimed to find the incidence of UTI in diabetic patients, their clinical presentation and pattern of antibiotic sensitivity and antibiotic resistance in our setting. This will guide for further management of our patients in future.

Methodology

Study design: This cross-sectional study was conducted at Taj Medical Complex, Hamdard University Hospital, Karachi, a teaching Hospital in joint collaboration with Medicine Department of the Hospital, from March 2015 to January 2017. A total of 395 patients of DM were randomly recruited in the study.

Study Population: All patients who were admitted to hospital due to any reason and having diabetes were included in the study, whereas nondiabetic patients were excluded from the study.

Data collection: All data were transformed in a Questionnaire that includes (Table 1) patient's age, duration of diabetes, any lower urinary tract symptoms, fever, flank pain and known co morbid. Laboratory information was gathered from files of the patients regarding hemoglobin A1C, urine D/R, Urine C/S, serum creatinine, proteinuria, glucosuria, Ultrasound Kidneys, ureter and bladder. Verbal consent was taken from patients before interviewing and patients were given written consent form for performing urine D/R and C/S. Data was maintained and analyzed on SPSS version 20.

Sample collection: Mid-stream urine was collected from a patient with full aseptic precautions. It was collected in a sterile container and closing the lid as soon as urine was collected.

Results

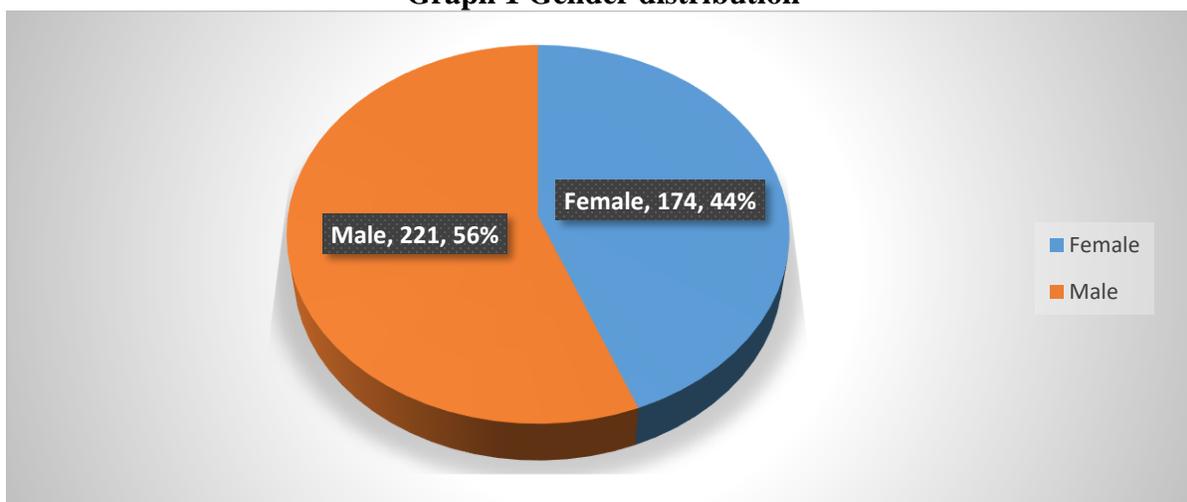
Among the 395 included patients, 44 % (174) were females and 56 % (221) were males (Table 1 & Graph 1). The age ranged from 28-90 years of age with a mean age of 54.44 ± 13.61 years. The body mass index ranged between 21.08 kg/m² to 28.88 kg/m² with mean of 24.93 ± 1.82 kg/m². The range of onset of diabetes is 21 to 67 years with mean age of 43.3 ± 10.03 . 362 were taking oral hypoglycemic agents (OHA), 9 were

under insulin and 24 were taking both insulin and OHA (Graph 2). The mean HbA1c was 8.08 ± 1.29 .

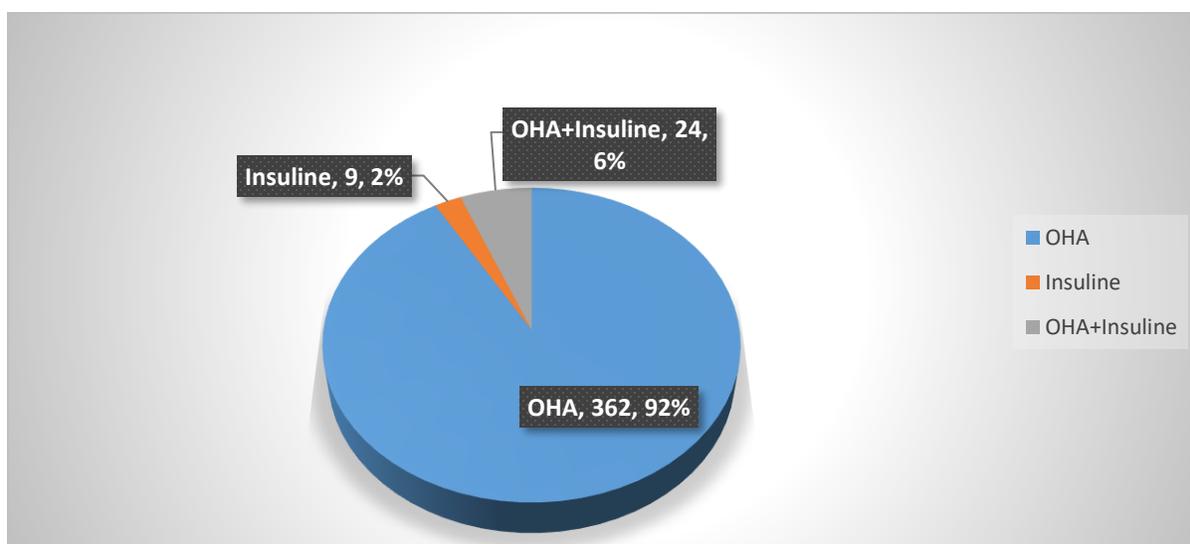
Table 1: Demographical Data

Age in yrs. (mean + SD)	54.44 \pm 13.61
Sex (Male / Female)	56% (221) / 44% (174)
BMI (Mean\pmSD)	24.93 \pm 1.82 kg/m
Mean Age of Diabetes	43.3 \pm 10.03
Mean HBA1c	8.08 \pm 1.29

Graph 1 Gender distribution

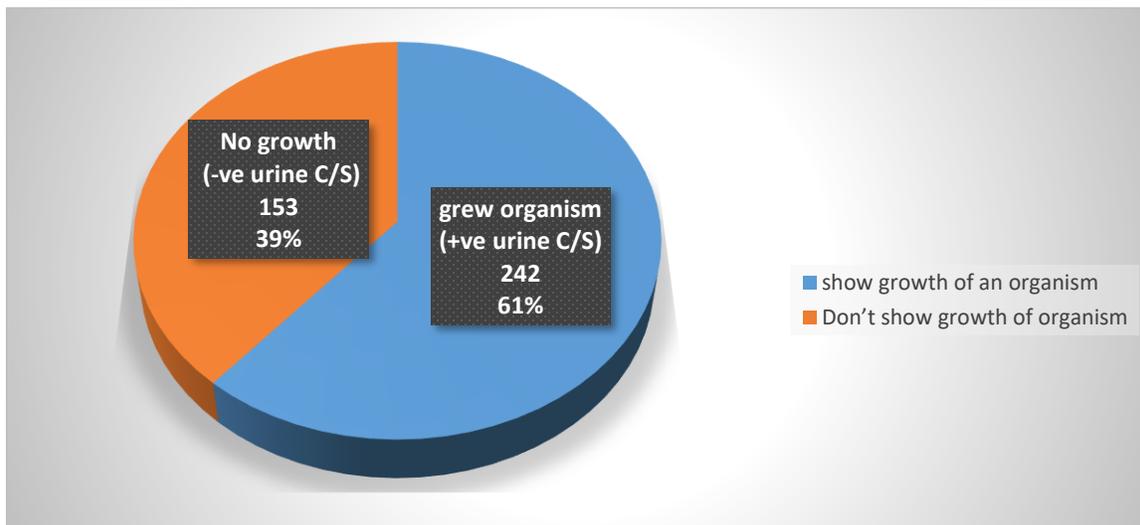


Graph 2 Patient taking type of hypoglycemic drug.

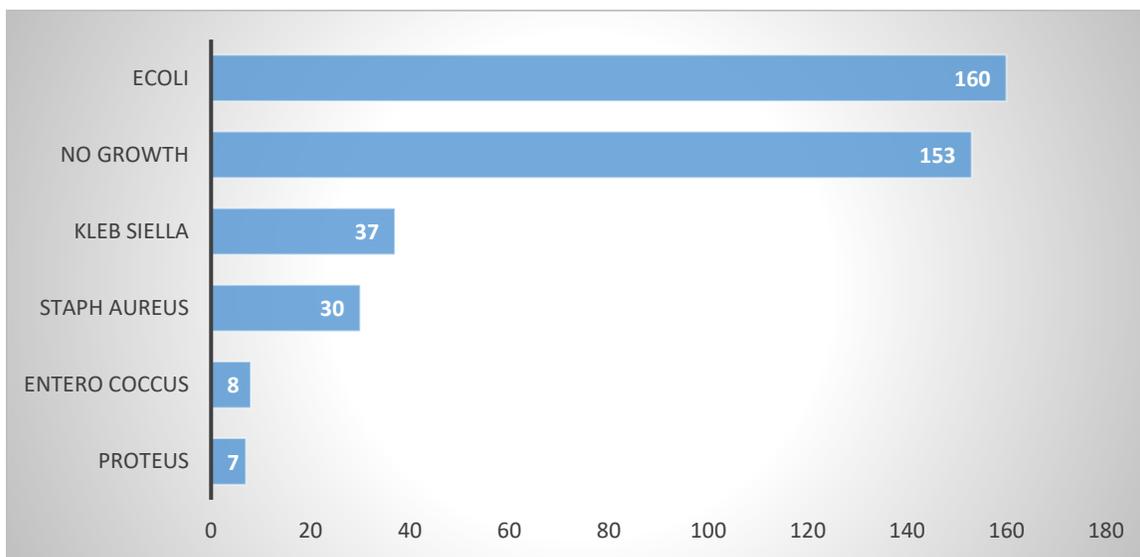


Family history of Diabetes was present in 56.7% (224) patients. Of 395 samples of urine C/S of diabetic patients, 242 samples of urine C/S showed growth of organisms of more than 10^5 CFU (colony forming units). The most common organism in 160 (66.11%) cases was E.coli. The other organisms isolated were klebsiella in 37 (15.28%) cases, staph aureus in 30 (12.4%), proteus in 7 (2.3%), enterococcus in 8 (3.3%) case. The organisms isolated are shown in Graph 3 & 4.

Graph 3 Results of Urine C/S



Graph 4 Frequency of microorganism growth



Pattern of Resistance:

UTI was found more common in those patients who were taking oral hypoglycemic agents as compared to those who were taking insulin. 8 patients among those who were taking insulin, there was no growth. Among 362 patient under OHA 229 had growth, 24 patients taking both (insulin+OHA) 13 had growth. UTI was found more common in post-menopausal female.

According to number, statistical analysis showed sex had positive correlation with UTI. Among 174 female 119 had positive Urine C/S and among 221 male, 123 had positive Urine C/S. Pattern of antibiotic sensitivity and resistance of the organisms were variable. E-coli- was sensitive to ciprofloxacin in 88.75%, ceftriaxone in 67.9% and imipenem in 100%. Klebsiella was 100% sensitive to ciprofloxacin. It was also 100% sensitive to imipenem. Staph aureus was sensitive to ciprofloxacin in 70% cases and 77% sensitive to ampicillin. E.coli was resistant to ampicillin, cefixime and gentamycin. Klebsiella was resistant to ceftriaxone and piperidic acid. Staph aureus was resistant to co-trimoxazole. Proteus was resistant to imipenem in 100% cases and enterococci were resistant to amikacin in 100% cases.

Discussion

Our study shows that females have a higher rate of UTI as compared to males in diabetics. E.coli was the leading etiological agent of UTI. It was also observed in our study that the UTI incidence increase with increasing age and vice versa⁷. The most effective antibiotic was found to be ciprofloxacin, imipenem, ceftriaxone. The most resistant antibiotic was found to be cotrimoxazole, ampicillin, gentamycin and cefixime. Several factors might have contributed to the variability of UTI in diabetics. Majority of the studies have taken organism isolation of >10⁵ significant. However, some authors advocate less than this can even be significant. The race, ethnicity and geographical variation might have contributed well. The difference in results of community based and hospital based studies is expected. Besides, healthy lifestyle, prompt diagnosis and treatment of other comorbid condition and significant awareness of disease gravity may contribute for differences in results⁸. This study found greater proportion of patients under oral hypoglycemic therapy was having UTI patients taking insulin are mainly at low risk. This study emphasized that the prevalence of UTI among the diabetes was considerably high. Because of the frequency and severity of UTI in diabetes, prompt diagnosis and early treatment is compulsory to prevent consequent complications⁹. In a recently published article from Saudi Arabia the Prevalence of UTI who have diabetics is

reported to be 25.3%¹⁰. In another study from Italy has mentioned about asymptomatic bacteriuria among diabetics and E.coli is the main culprit of UTI among asymptomatic Diabetics¹¹. The resistance for bacteria among microbes of urinary tract is increasing and they are causing community and hospital acquired urinary tract infections¹². In a recent study which is performed in an emergency department, there is a correlation that is present between cotrimoxazole resistance and patients with diabetes, recent admission to hospital and contemporary use of the same medicine¹³ but in an outpatient department setting there was no association found between E. coli resistance to cotrimoxazole or to quinolones and diabetes mellitus¹⁴.

Conclusion

The study concluded that the prevalence of UTI is higher in females as compared to male in asymptomatic diabetic patients. E.coli was the foremost etiological agent of UTI. It was also observed that the diseases incidence increases with increasing age and vice versa. Because of the frequency and severity of UTI in diabetes, prompt diagnosis and early treatment is compulsory to prevent consequent complications.

Conflict of Interest

None.

Acknowledgement

None.

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