Original Research Article

Assessment of urinary tract infections among type 2 diabetic patients in a rural teaching hospital, Sangareddy

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Abstract

Background: Urinary tract infections (UTIs) are more common in diabetic patients. The aim of this study was to evaluate the incidence of UTIs among hospitalized type 2 diabetic patients and to identify the most frequent bacteria responsible for UTIs.

Material and methods: The present study was carried out at MNR Medical College and Hospital situated in Sangareddy, Telangana. A total of 100 study subjects of both gender groups were selected from the medicine ward MNR hospital during the period from January 2019 to May 2019. After explaining the guidelines midstream urine samples were collected from the patients. The urine samples were immediately transported to the department of microbiology, MNR Medical College.

Results: From the total number (n=100) of patients, 11 had positive urine cultures, meaning 11%. Females (9%) had a significantly higher prevalence of urinary tract infection than men (2%). This showed that females with type 2 diabetes had a higher prevalence of urinary tract infection than men.

The most frequent bacteria involved in UTIs were *Escherichia coli* (54.5%) fallowed by *Klebsiella species* (18%) and *Proteus* spp with 9%.

Conclusion: The present study identified that the patients are at high risk with UTIs with uncontrolled glucose levels in type 2 DM patients attending to a teaching hospital. Therefore continuous screening for UTIs among Type 2 DM patients is recommended to reduce the further complications.

Key words

Diabetes Mellitus, Urinary tract infection, World Health Organization, American Diabetes Association, Glycosylated hemoglobin (HbA1c).

Introduction

Diabetes mellitus (DM) is a metabolic disorder characterized by hyperglycemia with disturbances of carbohydrate, protein and fat metabolism as a result of a defect in the synthesis of insulin or insulin action or both [1, 2, 3]. Long term complications of DM include the dysfunction and damage of various organs like kidneys, heart, nerves, eyes and blood vessels [4, 5, 6]. The prevalence of DM is increasing day by day in both developing and developed countries. According to the World Health Organization (WHO), India is having a high prevalence of DM and declared as a diabetes capital of the world [7, 8]. Among DM, the prevalence of type 2 DM is increasing day by day due to reduced physical activity and increased obesity [9, 10].

DM and urinary tract infections are closely associated with each other for over centuries. The incidence of UTIs is high in DM due to the change in the host defense mechanism, a microvascular disease in the kidney and the presence of diabetic cystopathy [11, 12]. High glucose concentrations in urine flow allow urinary colonization microorganisms. Incidence of UTIs is associated with various factors like age, duration of diabetes, sexual intercourse, glycemic control and complications of diabetes. So the present study aimed to assess the prevalence of urinary tract infections among type2 diabetic patients [13, 14].

Materials and methods

The present study was carried out at MNR Medical College and Hospital (650 beds teaching hospital catering to rural population) situated in Sangareddy, Telangana. A total of 100 study subjects of both gender groups were selected from the medicine ward MNR hospital during the period from January 2019 to May 2019. This study was approved by institutional ethical committee.

After explaining the guidelines midstream urine samples were collected from the patients. The urine samples were immediately transported to the department of microbiology, MNR Medical College. If the urine specimen was found to be contaminated with normal flora of the vagina and urethra, the subject was asked to submit another sample for analysis. A diagnosis of UTI was made if the urine cultures had >105 colony forming units (CFU)/mL of a single potential pathogen or two potential pathogens. Type 2 DM was diagnosed on the basis of guideline reported by the American Diabetes Association (ADA) and the World Health Organization criteria. Fasting blood glucose estimated by using GOD-POD method [ERBA-semi auto-analyser) [4, 5, 6] and HbA1c was estimated by using Ion exchange resin method [6, 7] [ERBA-semi auto-analyser).

Results

The present study was conducted on the patients who were admitted to the medical ward of a rural teaching hospital in Sangareddy for a period of 5 months.

Table – 1 shows the age and gender wise distribution of study subjects. Out of 100 type 2 diabetic study subjects 34 were males and 66 females.

Table - 1: Age and gender wise distribution of study subjects.

Age (Years)	Male	Female
25-30	03	05
31-40	05	14
41-50	10	22
51-60	07	14
61-70	09	11
Total	34	66

Table - 2: Study of diabetic profile among study subjects.

| Diabetic Profile	Study subjects (n=100) Mean ± SD
Fasting blood sugar (FBS mg/dl)	175.34 ± 9.94
Glycosylated hemoglobin (HbA1C %)	7.67 ± 1.52

Table - 3: Gender wise incidence of UTIs among study subjects.

	Women	Men	Total
With UTI	09	02	11
Without UTI	57	32	89
Total	66	34	100

The mean ± SDs of fasting blood sugar and HbA1c, in diabetic study subjects were in the range of 175.34 ± 9.94 and 7.67 ± 1.52 respectively. It was evident that the mean and standard levels of FBS and HbA1c are correlating with the clinical history as shown in **Table - 2**.

Table - 3 shows the gender wise distribution of UTIs among study subjects. Out of the total number of study subjects 11(11%) had UTIs. In order to estimate if there is a difference regarding the prevalence of UTI in male and female patients, we collected the data shown in **Table - 3**. Females (9%) had a significantly higher prevalence of urinary tract infection than men (2%). This will show that females with type 2 diabetes had a higher prevalence of urinary tract infection than men as shown in **Table - 3**.

Figure - 1 explained in detail about the most frequent bacteria involved in UTI, we found that 06 (54.5%) were with *E. coli*, 02 (18%) with *Klebsiella species* (spp.), 02 (18%) with *Proteus* spp and the remaining 9% with other microorganisms: *Candida* spp.

Figure – 1: Distribution of microorganisms encountered in UTI.
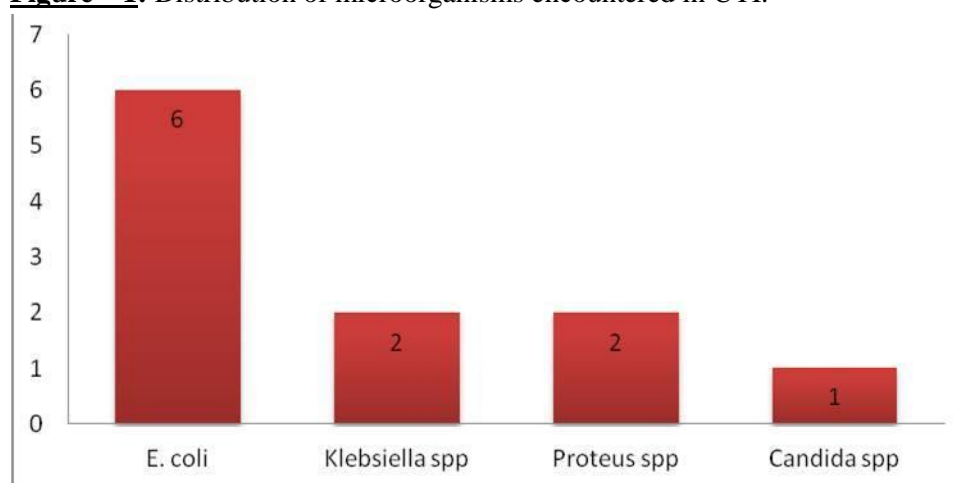
Discussion

In this study, we found that the incidence of UTIs was higher in females than in male's type 2 DM patients. According to Patterson JE, et al., 1995, prevalence of UTIs are common in women with type 2 DM than those of women without DM [15].

The prevalence of UTIs among type 2 DM patients in our study, was 11%, higher in women (9%) with type 2 DM than in Men (2%) with

type 2 DM. Similar results were reported by Renko M, et al. 2011 [16], Zhanel G G, et al. 1995 [17], Bonadio M, et al. 2006 [18]. Among the UTIs infected patients E.coli was the most common organism and fallowed by klebsiella spp, proteus spp, and candida spp, as shown in the **Figure – 1**. Similar results were reported by Sharma SS, et al. 2011 [19], Rai G.K., et al. 2008 [20], Shalini, 2011 [21].

In the present study, a higher incidence was noticed among type 2 DM patients with poor glucose control, according WHO reports, people with poor control are more prone to develop UTIs, which includes, bacterial (anaerobic), mycobacterial and fungal infections [22].

Conclusion

The present study identified that the patients are at high risk with UTIs with uncontrolled glucose levels in type 2 DM patients attending to a teaching hospital. Therefore continuous screening for UTIs among Type 2 DM patients is recommended to reduce the further complications.

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