Original Article

Study of Clinical Profile of Urinary Tract Infection in Type 2 Diabetes Patients

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Abstract

Introduction: Patients with diabetes mellitus are at higher risk of infection due to multiple abnormalities in the immune system. Patients are at higher risk of infection, and the course of infection is also more complicated than normal patients.

Aim: This study aims to study the clinical profile and risk factor of urinary tract infection (UTI) in Type 2 diabetes patients.

Materials and Methods: A total of 100 patients with diabetes mellitus with UTI were included in this study. A detailed history of the patient was taken regarding the duration of diabetes and its symptoms, complication, type, and treatment.

Results: Out of the total 100 patients, most commonly affected age group was 41–50 years (29%), most of the patients were female (56%). Most of the patient had a fever with rigor (52%), followed by dysuria (19%), suprapubic pain abdomen (16%), increase frequency of urine (22%), flank pain (11%), pyuria (9%), and hematuria (7%). The most common bacteria were *Escherichia coli* (39%) and *Klebsiella pneumoniae* (25%).

Conclusion: UTIs are frequent in diabetic patients. Improved glycemic control in people with diabetes may help in controlling UTIs. Accurate screening for UTI in diabetic patients is critical to enable the appropriate treatment and avoid related complications.

Key words: Diabetes mellitus, *Escherichia coli*, Urinary tract infection

INTRODUCTION

The burden of diabetes has steadily increased over the past quarter-century in India and globally, with India contributing a significant part of the global burden. Diabetes was identified as one of four priority non-communicable diseases targeted for action by the United Nations due to its growing disease burden.[1]

The urinary tract is a principal site of infection in diabetics. Urinary tract infection (UTI) encompasses various clinical entities, including asymptomatic bacteriuria (ABU), cystitis, prostatitis, and pyelonephritis. There can be an increased risk of ABU or symptomatic UTI in people with diabetes.[2]

The mechanism of pathogenesis for the association between diabetes mellitus and UTI is not completely clear. However, it is suspected that high glucose concentration in the urine of these patients may favor the growth of uropathogens. Human behavioral changes and lifestyle over the past century have resulted in a dramatic increase in the incidence of diabetes worldwide.[3,4]

UTI in diabetes can lead to severe complications, including bacteremia, renal abscess, and renal papillary necrosis. In some cases, diabetes modifies the genitourinary system and may cause damage to the organ, which leads to pyelonephritis. This type of UTI occurs 15 times more frequently in diabetic patients. Therefore, early diagnosis and correct treatment are very important for diabetes patients with UTI.[5,6]

Aim

This study aims to study the clinical profile and risk factor of UTI in Type 2 diabetes patients.

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MATERIALS AND METHODS

This cross-sectional study was conducted in the Department of Internal Medicine, Government Medical College Hospital, Virudhunagar, from January 2019 to December 2019 in type 2 diabetes patients presenting with complaints of UTI. A detailed history of the patient was taken regarding the duration of diabetes and its symptoms, complication, type, and treatment. Regarding UTI, history was taken with respect to dysuria, burning, suprapubic pain, urgency, increased frequency, and hematuria ever with chill rigor and vomiting suggestive of acute pyelonephritis. All patients were examined for signs of UTI such as fever, pulse, BP, suprapubic tenderness costovertebral angle tenderness, and abdomen examination. Under all aspartic conditions, midstream urine was collected, and the sample was sent to the laboratory for routine examination and culture.

RESULTS

Most of the patients in the study were female (56%) as compared to male (44%) [Figure 1]. The most common age group was 41–50 years [Figure 2]. About 56% of patients have diabetes for more than 5 years–<10 years [Figure 3]. Most of the patients were under oral management for diabetes [Figure 4]. Most of the patient had a fever with rigor (52%), followed by dysuria (19%), suprapubic pain abdomen (16%), increase frequency of urine (22%), flank pain (11%), pyuria (9%), and hematuria (7%). Most of the patients were having more than 1 sign and symptom [Figure 5]. Regarding the relation between diabetes and urinary tract complications, infection neuropathy was present in 48% of patients [Figure 6]. *Escherichia coli* (39%) was the most common organism isolated in urine culture, followed by *Klebsiella* (25%), *Pseudomonas* (8%), and other organisms, 18% of patients had no growth [Figure 7].

DISCUSSION

Studies have shown that diabetic patients are prone to have various kinds of infections more than non-diabetics. This high incidence rate of infections is attributed to altered immune functions such as polymorphonuclear leukocyte function and adhesion phagocytosis and chemotaxis. Particularly, acidosis can further depress polymorphonuclear leukocyte function. In diabetic patients, there is an impaired antioxidant system involved in bactericidal activity.[7] Hence, for appropriate recovery from infections, blood glucose levels should be closely monitored and controlled in diabetic patients.[8]

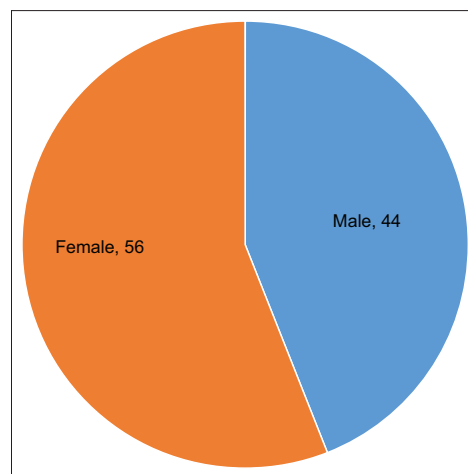In the present study, the prevalence of UTI was slightly higher in females (56%) than males (44%). Females are
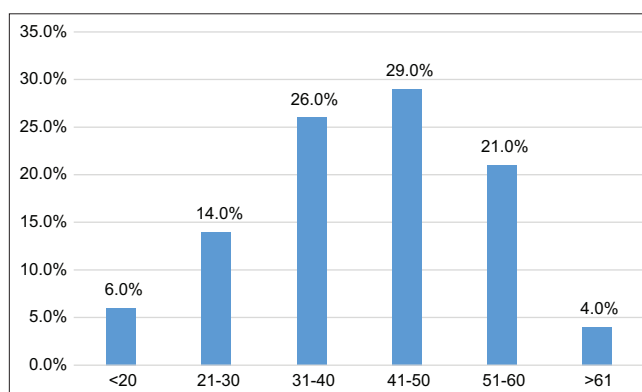

Figure 1*: Gender distribution*

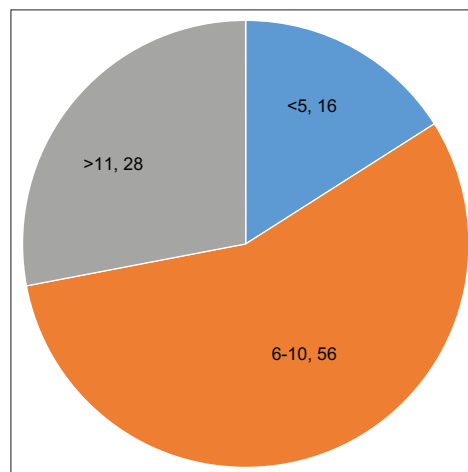**Figure 2***: Age group distribution*

Figure 3: Duration of diabetes

vulnerable to UTIs due to their anatomy and reproductive physiology. The short urethra, urethra closer to the perirectal area where pathogen colonies easily, absence of bacteriostatic prostatic secretions, and sexual intercourse may force bacteria into the female bladder.[9] Chaudhary *et al.* found 62.5% prevalence of UTI among females and 37.5% among males.[10] Ijaz *et al.* showed more similar
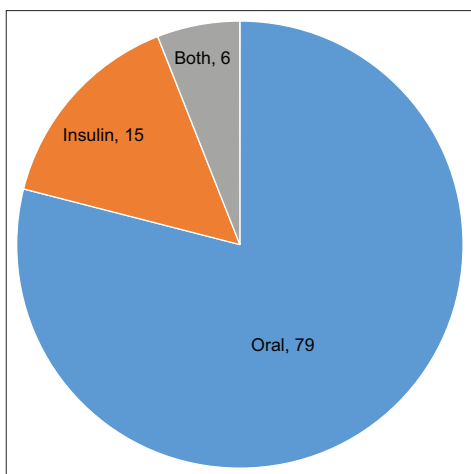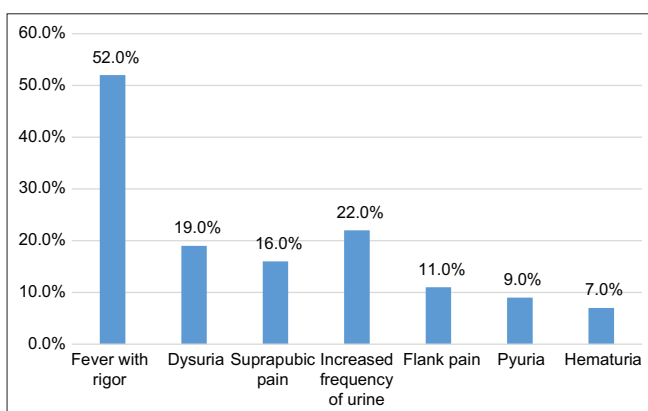
Figure 4: Treatment distribution

Figure 5: Presentation distribution

Figure 6: Complications distribution

Figure 7: Type of organism distribution

results to this study. They found 51.37% prevalence of UTI among females, while 48.63% in males.[11] Most frequently, patients were in the affected age group from 31 to 50 years (55%). This was similar to a study by Simkhada.[12]

A study done by Eshwarappa *et al.* demonstrated that fever and dysuria were the most common clinical presentation.[13]

Like in almost all the studies from international or national locations,[14,15] the most common bacterial isolate was *E. coli* (59.12%). It was similar to a case–control study done in New Delhi[16] showed *E. coli* as the most common bacteria in UTI (64.3%). In a study from Nepal,[12] it was 52.38%. While in Romanian study,[17] it was 70.4%.

Gram-positive pathogens were susceptible to cefoperazone-sulbactam, although Gram-negative pathogens were also sensitive to it. Amikacin was the most sensitive antibiotic for both Gram-positive and Gram-negative pathogens followed by nitrofurantoin. Piperacillin-tazobactam and meropenem were found to be sensitive only to Gram-negative microorganisms. Itraconazole was found to be a sensitive antifungal.
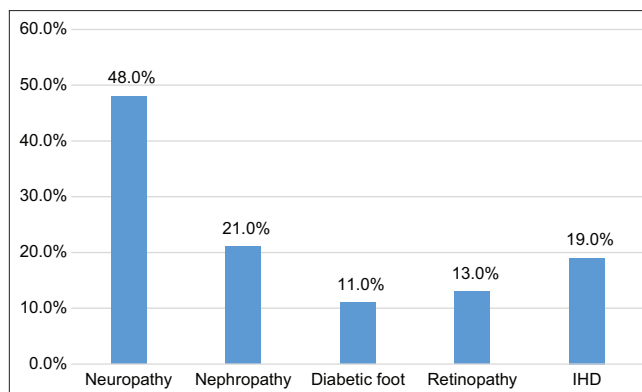
CONCLUSION

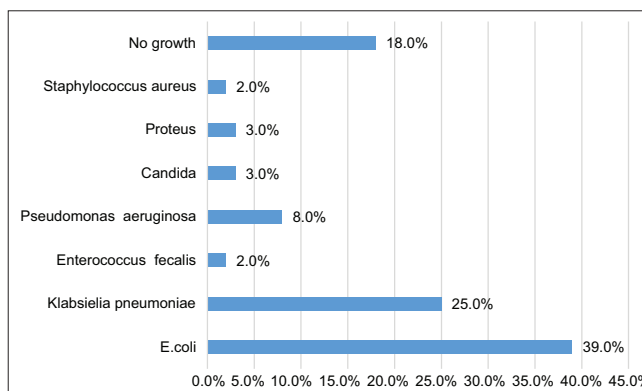Prevalence was found to be higher in women with type 2 diabetes than in men. Patients with type 2 diabetes mellitus and treated with the oral hypoglycemic agent are affected more frequently. The present study showed fever with rigor as the most common feature in patients. *E. coli* were the commonly isolated microorganism.

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