

“To Study the Bacteriological Profile, Drug Resistance Pattern, Risk Factors Associated with Urinary Tract Infection in Diabetic Patients at A Tertiary Care Hospital Kanpur”

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Abstract:

Introduction: Urinary tract infection (UTI) is a major problem in diabetics. Changes in host in defense mechanisms, the presence of diabetic cystopathy and micro-vascular disease in the kidneys may play a role in the higher incidence of UTI in diabetic patients. Urinary tract infection, such as pyelonephritis, renal or perinephric abscess, bacteremia and renal papillary necrosis occur more commonly in diabetic patients, acute renal failure is twice as likely to develop in bacteraemic patients.

Aim: - The study aimed to determine the “the bacteriological profile, drug resistance pattern, risk factors associated with urinary tract infection in diabetic patients.

Material and Methods: A total of 50 diabetic patients who were aged between 35 to 80 were selected for the study. Mid stream urine was collected following the standard protocol and immediately processed in the laboratory. Routine urinary microscopy and urine culture was done in all cases. Antibiotic susceptibility testing was done following CLSI guidelines 2020.

Results: In the present study, out of 50 samples prevalence of urinary tract infection in diabetic was (26%). Males are more affected than females and in age group > 55 years. The risk factor was patients with diabetic blood sugar level > 140 mg/dl. Most common organism isolated in urine cultures was *Candida* spp (30%), *E.coli* (25%), *Klebsiella* spp. (15%), *Staphylococcus* spp. (15%), *Proteus* spp. (15%). GPC isolates were 100% sensitive for Gentamicin, Amikacin, Vancomycin, Teicoplanin & Linezolid and GNB were and 88% sensitive for Meropenem & Imipenem and 100% sensitive for Colistin & Polymixin B.

Conclusion: Since the prevalence of UTI in diabetic patient was 26%, this study concludes that, Routine urine culture test should be carried out for all to detect prevalence and risk factors, and every positive case should be treated with appropriate antibiotic therapy.

Key Words: *Escherichia coli*, Diabetes, AST, Urinary tract infection.

Introduction

Diabetes mellitus has long been considered to be a predisposing factor for urinary tract infection (UTI) because of sugar in urine, which serves as media for growth of bacteria [1, 2]. Colonized urinary tract can also accelerate the prolonged release of bacteria with an increased risk of complications of the urinary system, ranging from dysuria (pain or burning sensation during urination) to the organ damage and sometimes even death [3, 4]. The most common bacteria associated with UTI in diabetics are *Escherichia coli*, *Proteus* spp., *Klebsiella* spp., *Pseudomonas aeruginosa*, *Enterococcus* spp., *Staphylococcus aureus*, and coagulase negative staphylococci (CoNS) [4, 5].

The urinary tract is the most common site of infection in type 2 diabetes mellitus (T2DM) patients.[6] A met analysis reported a higher point prevalence of

asymptomatic bacteriuria (ASB) among T2DM, 12.2% vs. 4.5% among healthy control subjects.[7] However, a study from India found no significant difference.[8] T2DM patients have increased the prevalence of complications of UTIs such as pyelonephritis, renal abscess, emphysematous cystitis and renal papillary necrosis, [9] and UTIs caused by resistant pathogens.[10].The present study was conducted to study the bacteriological profile, drug resistance pattern, risk factors associate with urinary tract infection in diabetic patients at a tertiary care hospital kanpur” In spite of all efforts to improve hospital hygiene,

Material and Methods

This was a prospective study conducted on 50 diabetic patients who were aged between 35 to 80 were selected for the study under the Department of Microbiology in a tertiary care hospital in Kanpur, UP, India. Patients without Diabetes and who were terminally ill were excluded from the study. Data were collected using a perform including presenting complaints and symptomatology, history of UTI, previous urinary catheterization, renal complications, and other comorbidities. Microbiological Analysis: Midstream urine samples were collected using a sterile container

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after clear instructions to the patients. Urine cultures yielding $\geq 10^5$ colony forming units were further processed to identify the pathogen using biochemical tests and perform the antibiotic susceptibility testing by the modified Kirby Bauer disc diffusion method.

Results

In the present study, out of 50 samples prevalence of urinary tract infection in diabetic patients was (26%). Males are more affected than females and in age group > 55 years. The risk factor was patients with diabetic blood sugar level > 140 mg/dl. Most common organism isolated in urine cultures was *Candida spp*(30%), *E.coli* (25%), *Klebsilla spp.* (15%), *Staphylococcus spp.* (15%), *Proteus spp.* (15%).GPC isolates were 100% sensitive for Gentamicin, Amikacin, Vancomycin, Teicoplanin & Linezolid and GNB were and 88% sensitive for Meropenem & Imipenem and 100% sensitive for Colistin & Polymixin B.

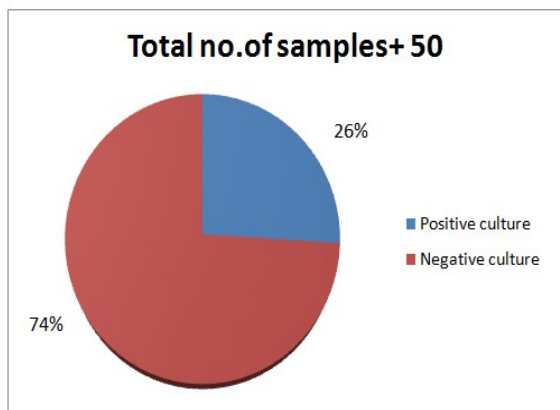


Figure 1: Percentage of positive urine culture

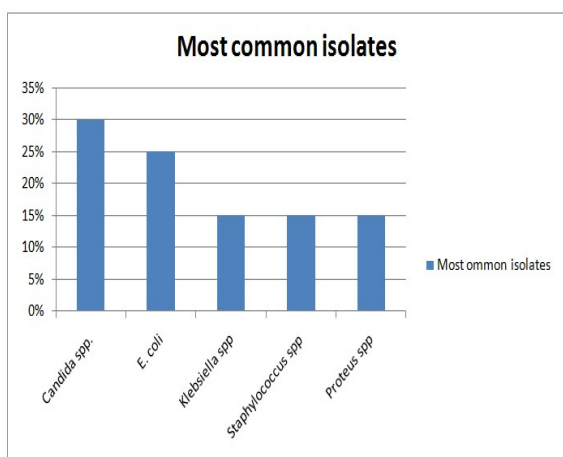


Figure 2: Shows most common isolates

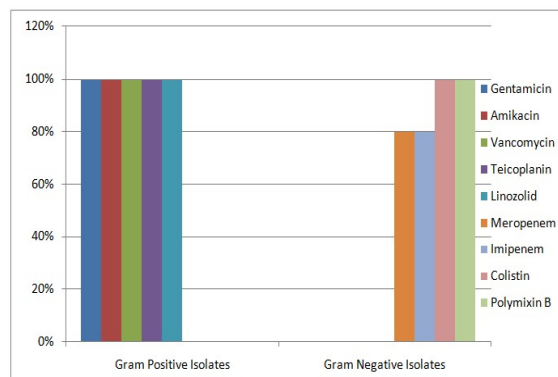


Figure 3: Shows the Antibiotic resistance pattern of the Gram positive and Gram negative isolates

Discussion

Diabetes mellitus has long been considered to be a predisposing factor for urinary tract infection (UTI) because of sugar in urine, which serves as media for growth of bacteria.

S. No.	Study	Year	Results
1.	Tesfaye Gutema et al.[11]	2018	The predominant isolates were <i>Escherichia coli</i> (25.6%) and <i>Klebsiella</i> spp. (20.5%). <i>E. coli</i> isolates showed higher sensitivity to ceftriaxone (80%), ciprofloxacin (70%), and gentamycin (70%), but resistant to tetracycline (60%). <i>Staphylococcus aureus</i> was sensitive to amoxicillin-clavulanic acid (85.7%), and gentamycin (57.1%), while resistant to tetracycline (85.7%), nitrofurantoin (85.7%), and ampicillin (71.4%).
2.	Martin Odoki et al.[12]	2019	The study revealed 86/267 (32.2%) UTI prevalence among patients attending hospitals in Bushenyi District, Uganda. <i>Escherichia coli</i> was the most prevalent bacterial uropathogen with 36/86 (41.9%) followed by <i>Staphylococcus aureus</i> 27/86 (31.4%), <i>Klebsiella pneumoniae</i> 10/86 (11.6%), <i>Klebsiella oxytoca</i> 6/86 (7.0%), <i>Proteus mirabilis</i> 3/86 (3.5%), <i>Enterococcus faecalis</i> 3/86 (3.5%), and <i>Proteus vulgaris</i> 1/86 (1.2%) is study has demonstrated that age ≤ 19 years, female gender, married individuals, genitourinary tract abnormalities, diabetes, hospitalization, indwelling catheter < 6 days, and indwelling catheter > 6 days had statistically significant relationships ($p < 0.05$) with UTI. Screening for UTI in hospitalized patients, female Gender, married individuals, genitourinary tract abnormalities, indwelling catheter, and diabetics should be adopted.
3.	Keithellakpam Kiranmala et al. [13]	2012	Similar to previous Indian studies, T2DM patients with UTI had significantly more asymptomatic bacteriuria, asymptomatic bacteriuria (32% vs. 6%), previous history of UTI (25% vs. 2%), and prior catheterization (16% vs. 1%). <i>Escherichia coli</i> (<i>E. coli</i>) was the most common organism isolated and showed sensitivity pattern of meropenem $>$ netilmicin $>$ amikacin $>$ nitrofurantoin. Ceftriaxone was the most common empirical therapy given in spite the prevailing low sensitivity of <i>E. coli</i> to it. All ASB cases were treated unlike recommendations.
4.	In the present study	2021	In the present study, out of 50 samples prevalence of urinary tract infection in diabetic was (26%). Males are more affected than females and in age group > 55 years. The risk factor was patients with diabetic blood sugar level > 140 mg/dl. Most common organism isolated in urine cultures was <i>Candida</i> (30%), <i>E.coli</i> (25%), <i>Klebsilla</i> spp. (15%), <i>Staphylococcus</i> spp. (15%), <i>Proteus</i> spp. (15%).GPC isolates were 100% sensitive for Gentamicin, Amikacin, Vancomycin, Teicoplanin & Linezolid and GNB were and 88% sensitive for Meropenem & Imipenem and 100% sensitive for Colistin & Polymixin B.

Our studies correlate with study conducted by Tesfaye Gutema et al. [11] Martin Odoki et al. [12] Keithellakpam Kiranmala et al. [13]

Conclusion

Since the prevalence of UTI in diabetic patient was 26%, this study concludes that, routine urine culture test should be carried out for all to detect prevalence and risk factors, and every positive case should be treated with appropriate antibiotic therapy.

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