

ANTIMICROBIAL RESISTANCE PATTERN AMONG DIABETIC PATIENTS WITH URINARY TRACT INFECTION AT BANGLADESH

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Abstracts

Introduction: Diabetes Mellitus (DM) is a worldwide health problem. Patients with type 2 diabetes mellitus are at increased risk of infections, with urinary tract being the most common site. UTI may be asymptomatic in DM patient. Worldwide there is a high frequency of antibiotic resistance. This study is designed to determine the causative organism of UTI in diabetic patient as well as their resistance pattern.

Methods: This cross sectional descriptive study was conducted in semiurban multispeciality hospital of Feni for a period of nine month from January 2020 to September 2020. One hundred consecutive culture positive UTI in diabetic patient were enrolled in this study. UTI with negative urine culture were excluded from the study. The organism isolated in culture and antibiotic sensitivity was noted.

Results: Age of this study population ranges from 20 to 80 years. Out of 100 patients with 39% were male and 61% were female. Twenty percent of the UTI were asymptomatic. *E. coli* was the commonest causative organism found in 64% cases, followed by *Klebsiella* 11% & *Proteus* 7%. Overall 84% organism were resistant to amoxicillin & 72% were resistant to quinolones. Most organism were sensitive to meropenem with only 11% resistance. Sixty percent of the isolates were resistant to 3 or more antibiotics.

Conclusion: *E. coli* being the commonest causative organism with very high frequency of antibiotic resistance & multidrug resistance.

Key words: Type 2 diabetes mellitus, urinary tract infections, antibiotic sensitivity

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Introduction

Diabetes Mellitus (DM) is a worldwide health problem with an expected prevalence of 593 million by 2035. Patients with type 2 diabetes mellitus are at increased risk of infections. The urinary tract is the commonest site.¹⁻² Predisposing factors includes impairments in the immune system,³ poor metabolic control of

diabetes,⁴ incomplete bladder emptying due to autonomic neuropathy,⁵ age, and diabetic nephropathy.⁶

Symptoms of UTI varies in different patient ranging from asymptomatic bacteriuria to cystitis, pyelonephritis and severe sepsis. Asymptomatic bacteriuria is quite prevalent in diabetic patient as shown in a study in sudan

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where asymptomatic bacteriuria was found in 19.9%.⁷

In recent years, there has been both a surge in antibiotic resistance (ABR)⁸ and a decline in the rate of new antibiotic development.⁹ ABR poses a significant risk in terms of mortality and economic burden worldwide. Due to the emergence of multidrug resistant (MDR) uropathogenic strains, the choice of antimicrobial agent is sometimes difficult. This study is designed to reveal the distribution of uropathogens in Diabetic patients and corresponding resistance patterns and to correlate the microbiological results with various clinical parameters.

Methods

This cross sectional descriptive study was conducted in semiurban multispeciality hospital of Feni for a period of nine month from January 2020 to September 2020. Ethical clearance was taken from institutional ethical committee, Feni Medical college, Feni. Urine culture were conducted in standard lab using blood agar media. One hundred consecutive culture positive UTI in diabetic patient were enrolled in this study. UTI with negative urine culture or culture positive UTI in non diabetic patient were excluded from the study. Urine culture showing a bacterial count of more than 10⁵ cfu/ml was regarded as culture positive. Demographic & clinical data of the patient with culture positive UTI were recorded using a well structured questionnaire after obtaining informed written consent. The organism isolated in culture and antibiotic sensitivity was noted. Data were analyzed using Microsoft excel 2010 version.

Result

Age of this study population ranges from 20 to 80 years. Out of 100 patients 39 (39%) were male and 61 (61%) were female. Twenty patients were asymptomatic having neither fever or dysuria, 40 patient having only dysria, 10 patient having only fever but no dysuria and 30 patient having both fever & dysuria (figure:1).

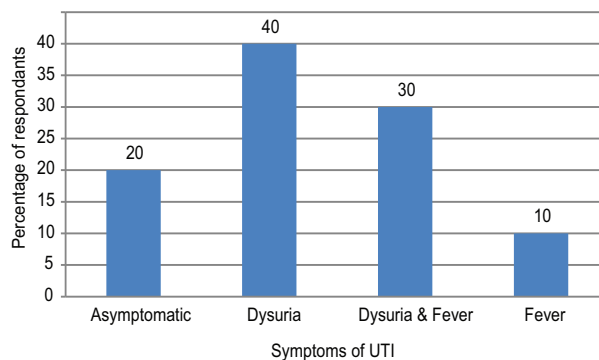


Fig.-1: showing symptoms is patients

Organisms grown in urine culture were Escherichia coli (64) followed by Klebsiella (11), Proteus (7), Staph Aureus (4), Pseudomonas (4), Acinetobacter (3), Sreptococcus(3), Enterococcus (2) and one each of Enterobacter and staph epidermidis (Figure:2).

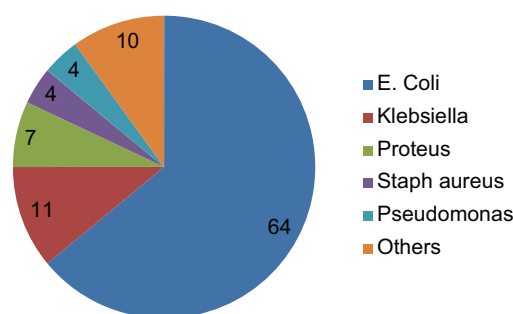


Fig.-2: Organism isolated

Overall resistance pattern in decreasing order of various commonly used antibiotics were Amoxicillin (84%), Quinolones (72%), Cefixime (61%), Cefuroxime (39%), Ceftriaxone (32%), Amikacin (19%), Nitrofurantoin (14%), Meropenem (11%) (Figure:3). Only 5 isolates were pansensitive, 35 isolates were resistance to two antibiotics & 60 isolates were resistance to 3 or more antibiotics (figure:4).

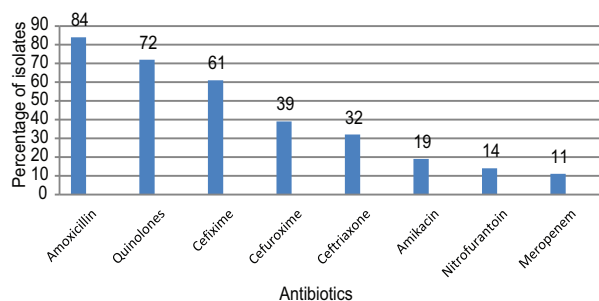


Fig.-3 : Overall antibiotic resistance pattern of organisms of UTI

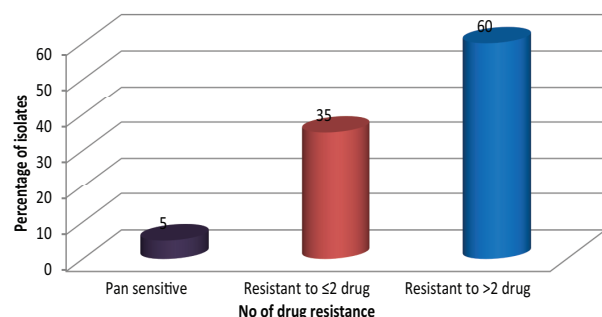


Fig.-4: Organism with multidrug resistance

Discussion

This study confirmed that overall UTI is more common in females. This study revealed that *Escherichia coli* and *Klebsiella* were the most prevalent pathogens which were similar to the study conducted elsewhere¹⁰. This study also revealed very high frequency of antibiotic resistance, with overall 84% & 74% of the organism were resistant to amoxicillin & quinolons respectively. Cefixime, Cefuroxime, Ceftriaxone showed resistance to 61%, 39%, 32% organisms respectively. The most effective antibiotic overall was meropenem with resistance in only 11% followed by nitrofurantoin (14% resistance) and amikacin (19% resistance). When considering a single organism, 94% of *E. coli* were resistant to Amoxicillin. Study in Ethiopia showed that over 60% of the isolated *E. coli* was resistant to ampicillin¹¹. Similar study in Kenya revealed only 23% of *E. coli* were resistant to Ampicillin¹². The frequency of antibiotic use and adherence to prescribed doses are some of the factors that can vary from place to place which may explain geographic variation. Higher frequency of antibiotic resistance are due to irrational antibiotic prescribing by physicians, a habit of self-medication among patients, and the indiscriminate use of antibiotics in agriculture and farming in different parts of the country^{13,14}. This study revealed very high frequency of multidrug resistance with 60 percent of the isolated were resistant to 3 or more antibiotics, which is much higher than that of study in Kenya¹². Economic burden of antibiotic is also huge since this study revealed most of the isolates were resistant to affordable antibiotics which is similar to the study in

Kenya & Indonesia^{12, 15}. Study showed Twenty patients were asymptomatic having neither fever or dysuria, 40 patient having only dysuria, 10 patient having only fever but no dysuria and 30 patient having both fever & dysuria. Less symptoms but significant laboratory findings were noted; especially in uncontrolled Diabetics indicate controlling hyperglycaemic episode, evaluating Diabetic patients with minimal symptoms and using antibiotic rationally will prevent complication in patients and growing resistance pattern.

Conclusion

In conclusion, diabetic patient, especially the uncontrolled group should be evaluated carefully for UTI. There is very high frequency of microbial resistance to commonly used antibiotic indicates antibiotic should not be used injudiciously. A culture & sensitivity test (C&S) is recommended before starting antibiotic. Knowledge on local antibiotic resistance pattern is essential to start antibiotic before a C&S report is available or in low resource area where CS is not possible.

Disclosures

Nothing declared.

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