

# DIFFERENCES IN BACTERIOLOGICAL AND ANTIBIOTIC SENSITIVITY PATTERNS IN UTI AMONG HOSPITALIZED DIABETIC AND NONDIABETIC PATIENTS.

MOHAMMED KAMRUL HASAN<sup>1</sup>, KHWAJA NAZIMUDDIN<sup>2</sup>, AKM SHAHEEN AHMED<sup>3</sup>, RENE SUZAN CLAUDE SARKER<sup>4</sup>, MUZAMMEL HAQUE<sup>5</sup>, A K M MUSA<sup>6</sup>

## Abstract:

*Aim of this study was to determine bacteriological pattern and there antibiotic sensitivity in UTI. The retrospective study carried out in department of internal medicine of BIRDEM on 300 consecutive patients with or without Diabetes Mellitus and whose urine culture shows growth of >10<sup>5</sup> organism/ml of urine, during the period from January 2006 to July 2007..*

*A total of 300 patients were included in the study. The highest number of isolates was E.coli (62%, 184) followed by Klebsiella (17%, 50), Pseudomonas (6%, 19), Enterococcus (8%, 23), Staphylococcus (3%, 10), Proteus (1%, 4) respectively in patient with DM (N=261) or without DM (N=39). All of these isolates were highly sensitive to Imipenem (96%) while some were high to moderate sensitive to other antibiotics. E.coli isolates showed high sensitivity to Aminoglycosides (72%, 133), Nitrofurantoin (70%, 129), and third generation Cephalosporin (61%, 112). Klebsiella was observed highly sensitive to third generation Cephalosporin (29%, 58) AND Nitrofurantoin (30%, 60).*

## Introduction

Worldwide the prevalence of DM is increasing day by day. The association of diabetes with an increased propensity of infection has In general, been well recognized<sup>1</sup>. The reason for this increase include incompletely defined abnormalities in cell mediated immunity and phagocyte function associated with hyperglycemia, as well as diminished vascularization secondary to long standing diabetes. On the other hand hyperglycemia facilitates the colonization and growth of variety of organism. Many common infections are more frequent and severe in the diabetic population<sup>2</sup>

Urinary tract infection means multiplication of organism in the urinary tract. Common organism causing urinary tract infections are E.coli and the remainders are Proteus, Klebsiella, Streptococcus and Staphylococcus epidermidis.<sup>3</sup> The susceptibility of the host and the presence of urinary tract pathogens are of primary importance in the development of infection. The microorganisms have

particular uropathogenic properties explaining infection in an otherwise normal urinary tract. Usually non uropathogenic strains can induce acute infection in case of urologic abnormalities or when the host defense mechanism are impaired, for example in children and elderly people, during pregnancy, in diabetic patient and in immunocompromised patients including patients after renal transplantation.

## Materials and Methods

The retrospective observational study carried out on 300 consecutive patients with proven UTI with or without Diabetes Mellitus during the period of January 2006 to July 2007 in the Department of Internal Medicine BIRDEM hospital. It includes 261 diabetic and 39 nondiabetic patients

## Aims and Objective

*General objective:*

To determine differences in the bacteriological and antibiotic sensitivity patterns in UTI of the pathogens concerned.

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1. Medical Officer, Internal Medicine, BIRDEM
  2. Professor, Internal Medicine, BIRDEM
  3. Registrar, Internal Medicine, BIRDEM
  4. Medical Officer, Internal Medicine, BIRDEM
  5. Assistant Registrar, Internal Medicine, BIRDEM
  6. Internal Medicine, BIRDEM

**Specific objective:**

To compare the epidemiological, microbiological and clinical features of diabetic patients with urinary tract infection (UTI) to those of non-diabetic ones.

**Criteria of Selection**

*Inclusion Criteria:*

- Diabetic and nondiabetic patient of both sex.
- Adult population age above >15 years.
- Sample containing >10<sup>5</sup> organisms/ml of urine
- Growth of organism in culture media with documented sensitivity.

**Exclusion Criteria:**

- Sample contain <10<sup>5</sup> organisms/ml of urine
- No organism in culture
- Patient having congenital urogenital anomalies.

**Collection of Urine Sample**

The clean catch technique of collection of midstream urine was employed in all patients. Urine was collected in sterile wide mouthed bottles with the help of trained nursing staffs. In some cases where the patient was intelligent and dependable patient has collected the urine himself/herself. Its placement into the pour plate within not more than two hours was ensured. In some cases the specimens had to be refrigerated for a few hours before pouring into a culture plate.

**Observation and Result**

This study showed that among the 300 patients majority were more than 60 years of age (115, 38%) and most of them were female (192, 64%). 87% (N-262) patient are diabetic and rest are non diabetic. Significant numbers of patient are afebrile (61, 20%). Among febrile patient 50% had intermittent fever. 118 patients (39%) were asymptomatic and 30% had more than one symptom like burning, frequency, urgency, incontinence of urine etc. Urine R/M/E showed 43% had plenty of pus cells in urine specimen. Culture revealed E.coli was the most common organism (N-184) causing UTI in both diabetic and nondiabetic. Next common pathogens are Klebsiella (N-50), Enterococcus (N-23) and Pseudomonas (N-19) respectively. Drug sensitivity showed Imipenem was highly sensitive antibiotic (281, 94%) in UTI.

Most interesting result found in Ciprofloxacin sensitivity study. Only 57 patients out of 300 were sensitive to this drug. Significant number of patient showed Aminoglycosides sensitivity (209, 69%) where as 174 patient (58%) showed sensitivity to 3<sup>rd</sup> generation Cephalosporin. Among the other drug Nitrofurantoin was the more sensitive drug (N-197, 66%) than cotrimoxazol (54, 18%) and Tetracycline (21, 7%). The most notable information revealed from the study is that the sensitivity didn't differ significantly in diabetic and nondiabetic.

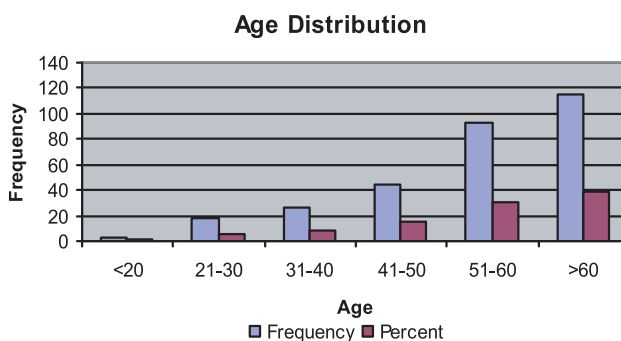


Fig.-1

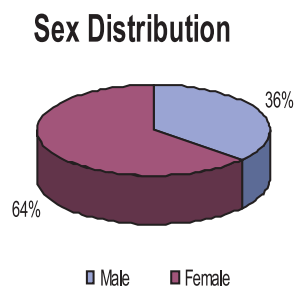


Fig.-2

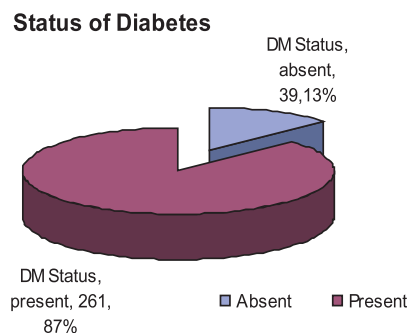


Fig.-3

### Symptoms of UTI

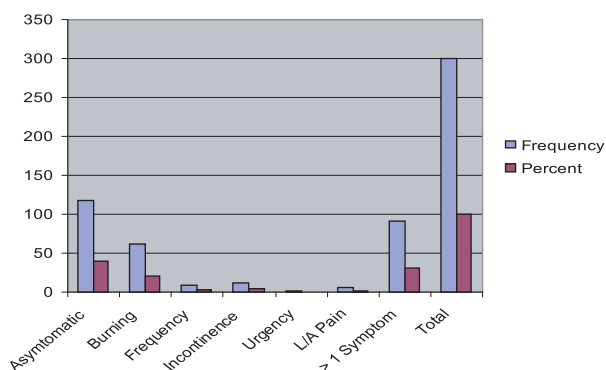


Fig.-4

### Urine C/S-DM Cross Tabulation

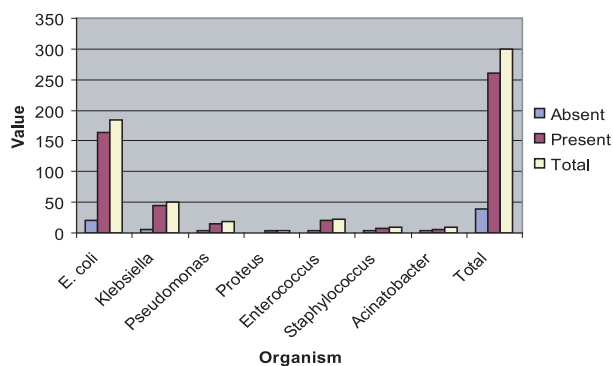


Fig.-5

### Discussion:

This study tried to determine whether there are differences in the microbiologic pathogens of urinary tract infection and in the antibiotic sensitivity pattern of the pathogens causing urinary tract infection both in diabetic and nondiabetic patient<sup>9</sup>.

In the present study the rate of E.coli isolation both in diabetic and non diabetic cases was(164,63%) and (20,52%) respectively which was much lower than that usually observed in community acquired(80%) urinary tract infection ,other organisms found causing urinary tract infection-Klebsiella(17%,50), Enterococcus (8%,23)Pseudomonas (6%, 19), Acinetobacter (3%, 10), Staphaureus(3%,10) in diabetic and non diabetic cases respectively. In one study it was found that E.coli was the most frequent uropathogens isolated and was responsible for urinary tract infection in 32.5% of diabetic and 31.4% of non diabetic male patient. And Enterococcus was isolated 9.4% vs. 14.5%, Pseudomonas isolated in

8.5% vs. 17.2% of diabetic and nondiabetic male patient respectively. So the major microbiologic pathogens causing urinary tract infection found in the study was almost similar to present study<sup>3</sup>.

Another study has shown that E.coli was the predominant organism in community acquired urinary tract infection in diabetic patient but significantly less in non diabetic population<sup>8</sup>. The percentage of Klebsiella species causing community acquired urinary tract infection in diabetic patient significantly higher than non diabetic<sup>10</sup>. In this study overall the most common organism is E.coli in both diabetic and non diabetic. But Klebsiella causing UTI 5% vs. 45%.This dissimilarity of result may be due to some patient have other infection with UTI<sup>5</sup>.

In the present study, the microorganism causing UTI both in diabetic and non diabetic patient were highly sensitive to Imipenem and other sensitive drug are Nitrofurantoin, Amikacin, while Ceftazidime, Netilmycin, Vancomycin, Tetracycline and ciprofloxacin fail to show demonstrable sensitivity<sup>12</sup>. Antimicrobial resistance among uropathogens causing community and hospital acquired UTI is increasing<sup>6</sup>.

### Conclusion

- Considering all factors **Aminoglycosides** and third generation **Cephalosporin** still has acceptable sensitivity against uropathogenic E. coli and can still be used in treatment failures, recurrent infections, and those with allergies to the drugs, along with **Nitrofurantoin**.
- Both E. coli and Klebsiella isolates in our hospital, showed high degree of resistance to **Cotrimoxazol** and **Quinolones**.
- Result also shows that there is a rising trend in incidence of resistance to **Sulphonamides**, **Ampicillin** and oral **Cephalosporin's**. This can be explained by the long time period for which these drugs have been available and in use for UTI.

### Recommendation

It is therefore recommended that studies to a larger scale should be done to monitor any changes in the sensitivity pattern of pathogens causing urinary tract infection due to the **“increasing resistance of organisms to common empirically used medications.”**

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