



TO STUDY STATUS OF GLYCEMIC CONTROL AND ITS IMPACTS ON PREVALANCE OF URINARY TRACT INFECTION IN DIABETIC PATIENTS

General Medicine

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ABSTRACT

Urinary Tract Infections are Second most common Infectious complain in Outpatient Primary Care Clinics. It has been estimated that UTI accounts for 7million hospital visits per year. An association between UTI and Diabetics was first noticed in Autopsy series in 1940. Many Autopsy Studies have shown an increased prevalence of UTI in Diabetics. Poor circulation in Diabetics, Dysfunctional bladder and poor ability of WBC to fight against infection causes UTI. Women are about two to three times more likely to have bacteria in the bladder compared to male. Risk of infections spreading upward is also common in Diabetics. Therefore, improved control of Glycemia in Diabetics may help in controlling UTI.

The Objectives of Study were:

1. To Assess Status of Glycemic control in Diabetic patients
2. To Study Impact of Glycemic control on Prevalence of Urinary Tract Infection in Diabetic patients.
3. To identify Common Isolates in Urine Culture of Diabetic patients.
4. To Identify Common Antibiotic sensitive to treat Urinary Tract Infection in Diabetic patients.

KEYWORDS

INTRODUCTION

It has been estimated India is home to around 40 million diabetics and this number is thought to give India the dubious distinction of being home to the largest number of diabetics in any one country. The infections are of particular concern for diabetic patients. Diabetes can slow down the body's ability to fight infections by weakening the immune system.

The Urinary Tract Infection (UTI) are the second most common infectious complaint in outpatient primary care clinics. By definition it means a bacterial / nonbacterial invasion of the urinary tract that can occur anywhere between the urethra and the kidney. UTIs can be divided anatomically into upper and lower tract infections.³In the male UTI are uncommon, and those of the lower tract infection includes prostatitis, Epididymitis, Cystitis, and Urethritis. Upper tract disease (Pylonephritis) is similar in males and females. Bacteruria can be symptomatic or asymptomatic.

Women with Diabetes are about two to three times more likely to have bacteria in their bladders than women without Diabetes. It affects many systems that protect against infection in general and against urinary tract infections specifically. Poor circulation in diabetics, reduced ability of white blood cells to fight infection, dysfunctional bladders that contract poorly all contribute to the increased prevalence of UTI in diabetics.¹¹Despite the fact that *E. coli* is the most frequent bacterium in UTI, other aggressive pathogens are highly prevalent in diabetic UTIs such as fungal infections, *Klebsiella*, Gram-negative rods, *enterococci*, group B *streptococci*, *Pseudomonas* and *Proteus mirabilis*. Therefore, improved control of glycemia in diabetics may help in controlling the UTIs. Accurate screening for UTI in diabetic patients is also critical to enable the appropriate treatment, avoiding related complications.

AIM:

To study the status of glycemic control and its impact on prevalence of urinary tract infection in Diabetic patients.

OBJECTIVES:

- To assess status of glycemic control in Diabetic patients.
- To study impact of glycemic control on prevalence of urinary tract infection in diabetic patients.
- To identify common isolate in urine culture of diabetic patients.
- To identify common antibiotic sensitive to treat urinary tract infection in Diabetic patients.

MATERIAL AND METHODS:

- This prospective study was conducted on 100 patients, admitted in medicine ward at Sir Takhatsinhji General Hospital, Bhavnagar.
- Study duration: 1 year, after taking permission from IRB, Govt.

Medical College, Bhavnagar.

- All patients were subjected to detailed history and thorough clinical examination.
- Investigations conducted, Blood Sugar (FBS, PP2BS, HbA1C), CBC, Serum creatinine, Urine routine and microscopy and culture and sensitivity, Ultra sound abdomen + KUB.

Inclusion criteria:

- All patients diagnosed with diabetes mellitus above the age of 12 years.

Exclusion criteria:

- Age less than 12 years/those who give negative consent.
- Pregnant patients
- Catheterized patients
- Patients with obstructive uropathy/renal stone
- Patients with demyelinating diseases leading to urinary retention
- Anatomic abnormality

OBSERVATION AND RESULTS

Below figure summarizes some important observations and outcomes of the subject study which demonstrates the frequency of bacteruria and non bacteruria distribution, age distribution as well as their observed correlation to type of diabetes.

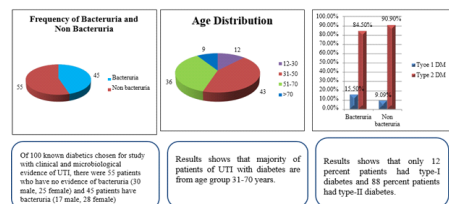


Figure 1: Key Observations and results-I

The results of the subject study were studied further as per symptoms and observed distribution is depicted in figure 2 below.

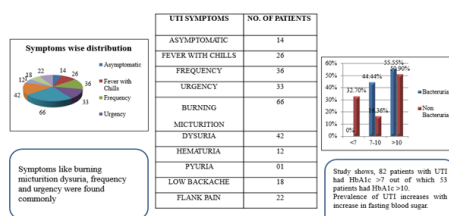


Figure 2: Key Observations and results-II

Figure 3 below summarizes the isolated organism. As it can be seen below, study shows most common isolate found was E.coli followed by klebsiella and enterococci. Rare isolates were pseudomonas and candida

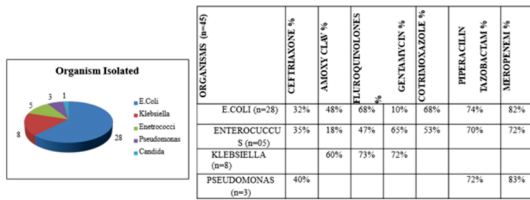


Figure 3: Key Observations and results-III

As shown in figure 4 below, there were 11 cases of pyelonephritis in the bacteruric group and 6 cases with cystitis in the bacteruric group.

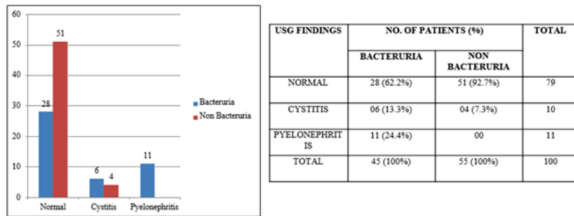


Figure 4: Key Observations and results-III

DISCUSSIONS:

A similar type of study was conducted in India by **Dr. Arun Thomas, Department of General Medicine Yenepoya Medical College Deralakatte, Mangalore, for a period of one year.** A total study of 100 patients were studied with same criteria as in our study

Higher frequency of bacteriuria among females than men were reported. **Arun Thomas**¹⁸ reported that gender wise prevalence of bacteriuria in women(62.8%) having a significantly higher prevalence of bacteriuria than men (37.2%).

In this study, we found that the prevalence of UTI was significantly higher in females(53%) than in male (47%) diabetic patients. Out of which, 52.83% females had bacteriuria while 36.1% males had bacteriuria.

| Gender | Present Study | Arun Thomas Study |
|--------------------------|---------------|-------------------|
| Females With Bacteriuria | 52.83% | 62.8% |
| Males With Bacteriuria | 36.17% | 37.2% |
| Total Patients | 45 | 43 |

There was significant correlation between age and prevalence of UTI in the present study in diabetic patients. This was similar to **Arun Thomas**¹⁸ who found higher incidence in middle to older age group(31-70 year).

| Age Group | Present Study | Arun Thomas Study |
|------------|---------------|-------------------|
| 31-70 year | 81% | 89% |

The present study did not show any significant incidence of bacteriuria based on type of diabetes (I or II), this was in concordance with the study done by **Arun Thomas**¹⁸

In the present study there was no significant correlation between bacteriuria and non bacteriuria with type treatment taken for diabetes. UTI is higher in patients taking OHA than other mode of treatment. Moreover, significant bacteriuria was found in group of patients who were not on treatment. Majority of the patients with urinary tract infections were not willing for insulin for control blood sugars, though it was advised. According to **Arun Thomas**¹⁸, bacteriuria was higher with patients on oral hypoglycemics.

| Mode of Treatment | Present Study | Arun Thomas Study |
|-------------------|---------------|-------------------|
| OHA | 44% | 50% |
| No Treatment | 10% | 9% |

In this study, symptoms like burning micturition, dysuria, frequency and urgency were found commonly.

The prevalence of leucocytosis was significantly higher in the bacteruric group. **Arun Thomas**¹⁸ had also noticed leucocytosis in 20% of patients in his study.

| Leucocytosis(>12000) | Present Study | Arun Thomas Study |
|----------------------|---------------|-------------------|
| Bacteriuria | 61.2% | 65% |
| Non Bacteriuria | 31.8% | 35% |
| Total (n=100) | 22% | 20% |

The study of blood sugar control using fasting blood sugar had shown that there was uncontrolled fasting blood sugars in both the groups (bacteruric and non bacteruric).

The study on HbA1c showed that all patients in the bacteruric group had HbA1c above seven, 53 patients in the bacteruric group above ten. **Arun Thomas**¹⁸ had found a higher incidence of bacteriuria in uncontrolled diabetics.

| HbA1c (>10) | Present Study | Arun Thomas Study |
|-----------------|---------------|-------------------|
| Bacteriuria | 25 | 37 |
| Non Bacteriuria | 28 | 39 |
| Total | 53 | 76 |

In this study the following organisms Escherichia Coli, Klebsiella, Enterococci, and Pseudomonas were isolated. Of which E. Coli (62.2%), was found to be predominant, the next being Klebsiella (17.7%). One sample contained Candida. Study done by **Arun Thomas**¹⁸ had found an increased incidence of E-coli 69.8% in diabetic patients with bacteriuria.

| Most Common Isolate | Present Study | Arun Thomas Study |
|---------------------|---------------|-------------------|
| E.Coli | 62.2% | 69.8% |

Most of the organisms were susceptible to antimicrobials like penicillins and fluoroquinolones. E.coli isolates in majority of the patients were sensitive to both penicillins and fluoroquinolones. Study done by **Arun Thomas**¹⁸ had found that Ampicillin, cotrimaxazole and fluoroquinolones were sensitive to most of the organisms.

In the present study, evidence of pyelonephritis was found in 11 patients, cystitis was found in 06 patients and 28 patients had a normal ultrasound evaluation in the bacteruric group.

CONCLUSIONS:

- Urinary tract infection is frequently encountered in diabetics. Prevalence was found to be higher in women with diabetes than in men. UTI was found to be significantly associated with advanced age.
- Only bacteriuria with symptoms of UTI should be treated with antibiotics to avoid the spread of drug resistant pathogens in the society. This practice can reduce the morbidity and mortality in diabetic patients suffering from urinary tract infection. The multidrug resistant pathogens are a challenge to society.
- Longstanding uncontrolled blood sugars (HbA1c) in diabetic patients, did show an increased propensity for developing urinary tract infections. Therefore, improved control of glycaemia in diabetics may help in controlling the UTIs.
- E. coli was the most common organism isolated in patients. Organisms were sensitive to antimicrobial agents like fluoroquinolones and piperacillin.
- It is essential that the clinician be aware of the local pathogen and susceptibility pattern to decide on the most appropriate antibiotic for empirical treatment to reduce the incidence of antimicrobial resistance and life threatening septicaemia. Accurate screening for UTI in diabetic patients is also critical to enable the appropriate treatment and avoiding related complications.

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