

Original Research

A Study On Uropathogens In Diabetic Patients from a tertiary care Hospital in Kanchipuram

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ABSTRACT:

Diabetes has long been one of the predisposing factors of UTI. There were several studies about the role of DM in etiology and resistance pattern of uropathogens with UTI. Hence this study was aimed to know the prevalence of Asymptomatic Bacteriuria (ASB) among diabetic patients

Materials and Methods:

This Study was conducted from May 2008 - Oct 2009. A total of 220 urine samples were collected from patients above 40yrs who attended the OPD with the history of diabetes and 100 urine samples were collected from non diabetics patients screened for and asymptomatic bacteriuria ($>10^5$ CFU /ml Urine). All urine samples were processed according to the standard protocol. Antibiotic sensitivity was done by kirby Bauer disc diffusion method.

Results:

Out of 220 diabetic patients, 52 had significant bacterial growth, and out of 100 non diabetic patients 22 had significant growth. UTI was more common in female patients in diabetes but more common in males in non diabetes. *E.coli* was the commonest isolate in both diabetic and non diabetic patients. The antibiotic resistance pattern in diabetics and non diabetics were found to be similar.

Conclusion:

Our study with asymptomatic UTI in diabetes mellitus, shows the antimicrobial resistance pattern for formulating antibiotic policies.

Keywords:

Diabetes, UTI, Asymptomatic bacteriuria.

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INTRODUCTION:

Urinary tract infection is a major problem in developing countries of all ages (Eshwarappa *et al.*, 2011). Diabetes mellitus is considered to be a predisposing factor for urinary tract infection (Jenifer and Geethalakshmi, 2009). Most UTI's are asymptomatic especially in women. Asymptomatic infections go unnoticed by the patient himself due to lack of signs and symptoms. Bacteruria is the second most common infection in developing countries (Jhan and Singh, 2009). The role of DM in etiology and in the antimicrobial resistance of uropathogens with UTI has not been studied by many authors in India (Eshwarappa *et al.*, 2011). Diabetes causes several abnormalities in the host defence system that might result in higher risk of UTI (Bokyko *et al.*, 2005). Several studies showed a higher prevalence of asymptomatic bacteriuria among women with diabetes (Bonadio and costarella, 2006). Hence asymptomatic infections are important in regard to health hazard.

Hence this study was aimed to know the prevalence of Asymptomatic bacteriuria (ASB) among elderly diabetic patients for the bacteriological profile and the antimicrobial resistance pattern of uropathogens.

MATERIALS AND METHODS:

Our study was conducted from May 2008 - Oct 2009. A total of 220 diabetic patients above 40 yrs of age attending our OPD were included in the study. A brief clinical history was taken from all the

patients. Inclusion criteria is all patients with Type-2 DM or proven cases of diabetes. Exclusion criteria include the pregnancy, known urinary tract anomalies, use of antimicrobial drugs. The fasting blood sugar level of the patients was estimated. Midstream clean voiding Urine samples were collected and streaked on to bloodagar, MacConkey agar plates and were incubated aerobically at 37°C for 24 hours. Bacteriuria was confirmed as the presence of atleast 10⁵CFU/ml of urine and they were subjected to a repeat culture for confirmation. Presence of 3 or more than 3 types of colonies were considered as contamination of urine and were asked for repeat culture. All the organisms were identified as per standard protocols.

Antibiogram was done by kirby Bauer disc diffusion method as per CLSI protocol 2009.

RESULTS:

Out of 220 diabetic patients, only 52(24.8%) had significant bacterial growth, 124(56.3%) had insignificant growth and 44(20%) had no growth. Among 100 non diabetic patients only 18(18%) had significant growth.

DISCUSSION:

In our study we tried to find whether there is any difference in the bacteriological profile of UTI and the antibiogram pattern of diabetic and non diabetic patients. The risk of UTI is higher in diabetic patients due to abnormalities in the metabolic control which leads to

Table I: Age and sex distribution of Diabetics and Non diabetics with ASB

Age%	Diabetes N = 52			Non Diabetes N = 18		
	Male%	Female%	Total%	Male%	Female%	Total%
40 – 49 yrs	4	7	11	1	1	2
50 – 59 yrs	7	10	17	4	2	6
>60yrs	11	13	24	6	4	10
Total	22(42.3%)	30(57.7%)	52(100%)	11(61.1%)	7(38.8%)	18 (100%)

From the above table, it is clear that ASB is present more in females in diabetic patients where as in non diabetics the males have more predominance. The incidence is more after the 6th decade of life in both diabetics and non diabetics.

Table II: Isolation of Uropathogens in male and female patients of diabetes.

Uropathogens	Diabetic Male N = 22		Diabetic Female N = 30	
	No	Percentage %	No	Percentage %
<i>E.coli</i>	12	35.2%	18	46.1%
<i>Klebsiella</i> spp.	9	26.4%	12	30.7%
<i>Proteus</i> spp	9	26.4%	5	12.8%
<i>Enterococci</i> spp	2	5.8%	3	7.6%
<i>S.aureus</i>	2	5.8%	1	2.5%
Total	34	100%	39	100%

The gram negative organisms were more common than gram positive organisms in both Male and Female Diabetic patients. With *E.coli* to be the predominant isolate in both the sexes, there were more than one isolate in some patients.

weakness in the host defense and glycosuria provides a favourable environment to micro organisms in the urinary tract (Joshi and Gregory, 1999).

Out of 220 diabetic patients only 52(23.62%) had significant bacterial growth, 124(56.4%) had insignificant growth and 44(20%) had no growth. Among the 100 control patients only 18(18%) had significant bacterial growth, 27(27%) had insignificant growth and 12(12%) had no growth.

In our study ASB are seen in 23.6% of people. This is slightly lower than (Jenifer and Geethalakshmi, 2009) who had reported ASB 30.3%. Many reports world wide reported ASB ranging from 5% to 30% (Sarah Wild et al., 2004).

In our study ASB is seen in diabetic patients who are suffering from diabetes for a longer duration and bacteriuria more after the 6th decade of life.

This is concordant with other studies. In non diabetics also ASB is seen more after the 6th decade of life (Ramzan et al., 2004). This could be due to neutropathic complications (incomplete bladder emptying) and increased glucose concentration in urine, which may provide a good culture medium which favours the seeding of bacteria and genesis of infection in urinary tract in diabetics (Thomas and Jeyaraman, 2010).

Evidence from various epidemiological studies showed that UTI is more common in women with diabetes (Patterson and Andriole, 1997). Our study is also concordant with the other studies which report to be that UTI is more common in women with diabetes. But in non diabetes UTI is more common in males here our study is concordant with (Moorthy et al., 2011). Our study reveals that GNB is more common than GPC in UTI in diabetic and non diabetic patients. *E.coli* is the common isolate in both the diabetics and non diabetics. This is concordant with other studies done (Bonadio and costarella, 2006).

A study done by Jeniffer et al showed that *E.coli* (71%) and *Klebsiella* spp (13%) and *Enterobacter* spp (4%) were isolated from female diabetic patients. Several other studies showed that *E.coli* is the common isolate (Goswami and Tejasmi, 2001). The higher prevalence of *E.coli* may be due to poor hygienic condition of the patients and especially higher among females due to the contamination of perineum through fecal flora (Park K, 2008).

Table-III Isolation of Uropathogens in Male and Female patients of non diabetics

Uropathogens	Non diabetic(18)			
	Male n = 11		Female n =7	
	No	Percentage %	No	Percentage %
<i>E.coli</i>	5	38.4%	4	50.0%
<i>Pseudomonas</i> spp.	3	23.1%	1	12.5%
<i>Klebsiella</i> spp	3	23.1%	2	25.0%
<i>S.aureus</i>	2	15.3%	1	12.5%
Total	13	100%	8	100%

Among the non diabetic population *E.coli* was found to be the predominant isolate followed by *Pseudomonas* spp.

Table IV Resistance pattern of various isolates from diabetic and non diabetic patients

Diabetics n = 52						Non Diabetics n = 18			
Antibiotic used	<i>E.coli</i> n = 30	<i>Klebsiella</i> n=21	<i>Proteus</i> n = 14	<i>Enterococci</i> n=5	<i>S.aureus</i> n=3	<i>E.coli</i> n=9	<i>Pseudomonas</i> n=4	<i>Klebsiella</i> n=5	<i>S.aureus</i> n=3
Ciprofloxacin	22%	11.1%	8.5%	2.1%	1%	24%	10.1%	8.5%	1%
Amikacin	9.8%	7.1%	9.1%	1%	1%	10.4%	6.4%	9.1%	1%
Gentamycin	20%	6.2%	5.2%	-	-	18.4%	5.1%	5.2%	-
Norfloxacin	12.4%	9.1%	3%			14%	8%	1%	-
Ofloxacin	10.4%	6.2%	3%	1%		11.5%	5.4%	1%	-
Ceftriaxone	11.9%	8.9%	5.2%	-	-	9.8%	7%	5%	-
Ceftazidime	15.4%	3.1%	6.1%	-	-	13.2%	4.1%	4.1%	-

The antimicrobial resistance pattern in diabetics was found to be higher.

(Akram *et al.*, 2007) reported the ciprofloxacin resistance of 47 to 69% among gram negative organisms in India. Our study showed 22% resistance to ciprofloxacin.

In our study all the gram negative isolates were resistant to amikacin and gentamicin. This is concordant with (Eshwarappa *et al.*, 2011) who has also reported nearly half of uropathogens showing resistance to amikacin and gentamicin. All our GNB isolates were sensitive to Imipenem.

In the non diabetics gram negative isolates showed maximum resistance to aminoglycosides and quinolones.

In our study with asymptomatic UTI, diabetes mellitus could not be considered as the risk factor for UTI.

CONCLUSION:

From our study ASB is more common after the 6th decade of life in diabetic females.

E.coli was the most frequent isolate in diabetics and non diabetics. Diabetics has large post void residual urine than non diabetic-this difference may be the higher

risk of UTI. Hence diabetic patients must be regularly screened for urine examination for detection of ASB along with blood sugar.

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