Section: Medicine

Comparison of Aerobic Bacteria Isolation among Symptomatic and Asymptomatic Urinary Tract Infection of Diabetics.

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ABSTRACT

Background: Diabetics are more prone for infections, as well infections can lead to various complications. The aim of the study is to isolate aerobic bacteria and its antibiotic sensitivity pattern among symptomatic and asymptomatic UTI Diabetic patients. **Methods:** Urine samples of both symptomatic and asymptomatic group of Diabetic patients were collected and sent to Department of Microbiology for culture and sensitivity analysis. All urine samples were assessed at aerobic culture lab using standard techniques, semi quantitative culture was done. Various Organisms were isolated and antibiotic sensitivity testing was done by Modified Kirby Bauer method using CLSI guidelines. **Results:** Organisms isolated among Symptomatic UTI diabetic patients were: Escherichia coli - 24%, Klebsiella pneumoniae & Staphylococcus aureus - 14%, CoNS & Proteus mirabilis - 4%, Pseudomonas aeruginosa & Enterobacter aerogenes - 6% and among asymptomatic UTI diabetic patients: Escherichia coli - 10%, Klebsiella pneumoniae - 8%, Staphylococcus aureus - 6%, Pseudomonas aeruginosa & Enterobacter aerogenes - 2%. Most of the isolates of both symptomatic and asymptomatic UTI shown more resistant to amoxyclav, cefotaxime and shown about 100% sensitive to gentamicin, nitrofurantoin, norfloxacin, ofloxacin. **Conclusion:** As Antibiotic Resistance towards various organisms are also reporting more and more now-a-days. Both symptomatic and asymptomatic UTI has to treat in a proper way and diagnosis by culture is must, as poly microbial organisms are usually detect.

Keywords: Asymptomatic UTI, Diabetics, Symptomatic UTI.

INTRODUCTION

Urinary Tract Infections (UTIs) are the frequent infections observed in clinical practice and results in a significant morbidity and high medical costs. UTI in diabetics is often given less importance, more attention being paid to macro & micro vascular complications.

Diabetes Mellitus is a syndrome characterized by chronic hyperglycemia and disturbance of carbohydrate, fat and protein metabolism associated with absolute or relative deficiencies in insulin secretion and or insulin action.[1]

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Cardiac arrhythmias and conduction abnormalities Diabetics are more prone for infections, as well infections can lead to various complications. Among various infections, urinary tract is the most common site affected. Among Diabetics UTI can lead to various consequences like Renal / peri renal abscess, Papillary necrosis, Emphysematous cystitis, Emphysematous pyelonephritis / pyelitis, Xanthgranulomatous pyelonephritis.[2]

The mechanism which contribute to urinary tract infections among diabetics are: Defects in the secretion of local urinary cytokines such as IL-8, IL-6; due to changed and lowered Tamm Horsfall protein and granulocyte dysfunction; increased adherence of microorganisms to the uroepithelial cells[3] and also hyperglycemia facilitates the colonization and growth of various organisms.[4]

Awareness of the disease, knowledge of the spectrum of bacteria and their sensitivity to antibiotics and the common complications of UTI will help to reduce morbidity and mortality. Antimicrobial resistance among bacteria causing UTI is increasing now-a-days.[5] There is much need of assessing culture and sensitivity of bacteria causing UTI, for providing accurate treatment to patients and also to decrease the antibiotic resistance emergence.

The aim of the study is to isolate aerobic bacteria and its antibiotic sensitivity pattern among symptomatic and asymptomatic UTI Diabetic patients.

MATERIALS AND METHODS

A prospective study was done among Diabetic patients at Department of General Medicine, Government Medical College, Ananthapuram. Study was done after taking approval of ethical committee and informed consent from selected patients.

A total of 100 Diabetic mellitus type II patients were selected to do this study. 50 patients were considered as cases (Symptomatic Group), those who presented with symptoms of UTI and remaining 50 patients were considered as controls (Asymptomatic group), normal diabetic patients attended to OPD without any symptoms of UTI.

Urine samples of both symptomatic and asymptomatic group of Diabetic patients were collected and sent to Department of Microbiology for culture and sensitivity analysis.

All urine samples were assessed at aerobic culture lab using standard techniques, semi quantitative culture was done.[6] Various Organisms were isolated and antibiotic sensitivity testing was done by Modified Kirby Bauer method using CLSI guidelines.[7]

Isolated aerobic microorganisms from urine samples and their antibiotic sensitivity patterns were noted and entered into excel sheet. All the results were tabulated and analyzed.

RESULTS

A total of 214 Diabetes mellitus patients who were coming to Outpatient Departments of Government General Hospital, Vijayawada were examined and case history was taken. Among these 214 diabetic patients, 50 (23.3%) patients complaining of Urinary Tract Symptoms including frequency and burning micturition, dysuria, dribbling of urine, supra pubic tenderness, abdominal pains were considered under Symptomatic UTI group.

The mean age group of symptomatic and asymptomatic UTI of Diabetics were 45.6±3.05 and 44.3±2.3 respectively. Female predominance was seen in both symptomatic and asymptomatic groups, of 66% and 56% respectively.

Among 50 symptomatic group of patients, 36 (72%) were culture positive and 50 asymptomatic UTI, 14 (28%) were culture positive.

On assessing most common complaints of UTI among symptomatic group. Frequency (86%) and burning micturition (76%) were most common symptoms followed by urgency (56%), dysuria (32%), abdominal pain (28%) and fever (46%) [Figure 1].
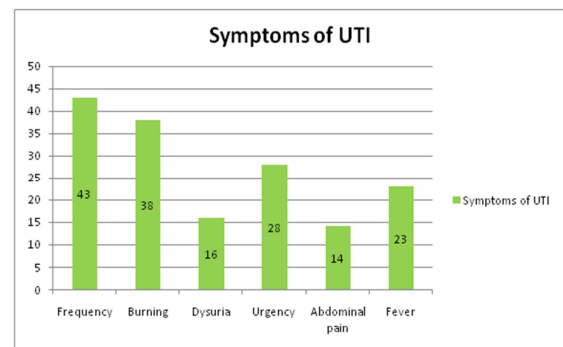

Figure 1: Diagrammatic representation of complaints of symptomatic UTI.

Table 1: Various causative organisms isolated from symptomatic and asymptomatic diabetic UTI patients.

S.No.	Causative Organism	Symptomatic UTI		Asymptomatic UTI		Total
		No. of patients (n=50)	Percentage (%)	No. of patients (n=50)	Percentage (%)	
1	Escherichia coli	12	24	5	10	17
2	Klebsiella pneumoniae	7	14	4	8	11
3	Staphylococcus aureus	7	14	3	6	10
4	CoNS	2	4	-	-	2
5	Proteus mirabilis	2	4	-	-	2
6	Pseudomonas aeruginosa	3	6	1	2	4
7	Enterobacter aerogenes	3	6	1	2	4
	Total	36	72	14	28	50

CoNS - Coagulase Negative Staphylococci

Table 2: Antibiotic sensitivity pattern of organisms isolated from symptomatic UTI.

Antibiotics	Esch.coli (n=12)	K.pneumoniae (n=7)	S.aureus (n=7)	CoNS (n=2)	P.mirabilis (n=2)	P.aeruginosa (n=3)	E.aerogenes (n=3)
AMC	3 (25)	1 (14.2)	1 (14.2)	0	0	0	0
PIT	8 (66.6)	4 (57.1)	5 (71.4)	1 (50)	1 (50)	2 (66.6)	2 (66.6)
CF	6 (50)	3 (42.8)	3 (42.8)	0	0	0	0
CRT	8 (66.6)	5 (71.4)	4 (57.1)	1 (50)	1 (50)	1 (33.3)	1 (33.3)
TE	9 (75)	6 (85.7)	6 (85.7)	2 (100)	1 (50)	2 (66.6)	2 (66.6)
COT	8 (66.6)	5 (71.4)	5 (71.4)	1 (50)	1 (50)	2 (66.6)	1 (33.3)
NR	11 (91.6)	7 (100)	7 (100)	2 (100)	2 (100)	3 (100)	2 (66.6)
OF	10 (83.3)	6 (85.7)	6 (85.7)	2 (100)	2 (100)	3 (100)	3 (100)
NIT	11 (91.6)	7 (100)	7 (100)	2 (100)	2 (100)	3 (100)	3 (100)
GEN	12 (100)	7 (100)	7 (100)	2 (100)	2 (100)	3 (100)	3 (100)

AMC - Amoxyclav, PIT - Piperacilin + tazobactum, CF - Cefotaxime, CRT - ceftriaxone + tazobactum, TE - Tetracycline, COT - Cotrimoxazole, NR - Norfloxacin, OF - Ofloxacin, NIT - Nitrofurantoin, GEN - Gentamicin

Various microorganisms were isolated from symptomatic and asymptomatic UTI among Diabetics. Among both groups Escherichia coli is the predominant organism followed by Klebsiella pneumoniae and Staphylococcus aureus [Table 1].

Antibiotic sensitivity pattern of aerobic bacteria isolated from diabetic patients with symptomatic UTI was assessed [Table 2]. Most of the isolates shown more resistant to amoxyclav, cefotaxime and shown about 100% sensitive to gentamicin, nitrofurantoin, norfloxacin, ofloxacin.

Antibiotic sensitivity pattern of aerobic bacteria isolated from diabetic patients with asymptomatic UTI was assessed [Table 3]. Most of the isolates shown more resistant to amoxyclav, cefotaxime and shown about 100% sensitive to gentamicin, nitrofurantoin, norfloxacin, ofloxacin.

Table 3: Antibiotic sensitivity pattern of organisms isolated from asymptomatic UTI.

Antibiotics	Esch.coli (n=5)	K.pneumoniae (n=4)	S.aureus (n=3)	P.aeruginosa (n=1)	E.aerogenes (n=1)
AMC	1 (20)	1 (25)	0	0	0
PIT	1 (20)	2 (50)	2 (66.6)	1 (100)	0
CF	1 (20)	1 (25)	0	0	0
CRT	3 (60)	2 (50)	2 (66.6)	0	1 (100)
TE	3 (60)	3 (75)	2 (66.6)	1 (100)	0
COT	4 (80)	3 (75)	1 (33.3)	0	0
NR	5 (100)	4 (100)	3 (100)	1 (100)	1 (100)
OF	4 (80)	2 (50)	3 (100)	1 (100)	1 (100)
NIT	4 (80)	4 (100)	3 (100)	1 (100)	1 (100)
GEN	5 (100)	4 (100)	3 (100)	1 (100)	1 (100)

AMC - Amoxyclav, PIT - Piperacilin + tazobactum, CF - Cefotaxime, CRT - ceftriaxone + tazobactum, TE - Tetracycline, COT - Cotrimoxazole, NR - Norfloxacin, OF - Ofloxacin, NIT - Nitrofurantoin, GEN - Gentamicin

DISCUSSION

Urinary tract infections (UTIs) is defined as growth and multiplication of micro-organisms in the urinary tract that involves the bladder, ureters and the kidneys. UTI is the commonest bacterial infection of mankind.

In this study the mean age group of symptomatic and asymptomatic UTI of Diabetics were 45.6±3.05 and 44.3±2.3 respectively. Female predominance was seen in both symptomatic and asymptomatic groups, of 66% and 56% respectively.

As per Md Hamaz Saber et al[8] the mean age of diabetic and non diabetic patients were 49.5 ± 8.3 years and 43.4 ± 17.4 years respectively. Acharya D et al[9] documented that the mean age of diabetic and non diabetic patients were 56±1.5 years and 52±1.4 years respectively. Many studies documented that there is female preponderance among UTI patients.[10] This may be due to, in women, the urethra is much shorter and very close to the anus, which is a constant source of fecal bacteria.[11]

As per this study, Organisms isolated among Symptomatic UTI diabetic patients were: Escherichia coli- 24%, Klebsiella pneumoniae & Staphylococcus aureus - 14%, CoNS & Proteus mirabilis-4%, Pseudomonas aeruginosa & Enterobacter aerogenes- 6% and among asymptomatic UTI diabetic patients: Escherichia coli- 10%, Klebsiella pneumoniae-8%, Staphylococcus aureus- 6%, Pseudomonas aeruginosa & Enterobacter aerogenes - 2%.

Md Hamaz Saber et al[8], Vishal Sharma et al[12], Acharya D[9], Mehvish saleem et al[13] supports our study by stating that escherichia coli is the most common organism isolated from Diabetic UTI patients followed by Klebsiella species. In contrast to this study, The percentage of infections with Klebsiella species is higher in diabetic persons than in those without diabetes mellitus.[14]

In this study, Out of 36 isolates of aerobic bacteria, around 20% of isolates shown sensitive towards amoxyclav, about 50% were sensitive to cefotaxime, around 60% of isolates were sensitive to piperacillin + tazobactum, ceftriaxone + tazobactum, tetracycline, cotrimoxazole and almost 90-100% isolates were sensitive to norfloxacin, ofloxacin, nitrofurantoin and gentamicin.

As per this study, Out of 14 isolates of aerobic bacteria, around 20% of isolates shown sensitive towards amoxyclav, cefotaxime, around 50% of isolates were sensitive to piperacillin + tazobactum, ceftriaxone + tazobactum, about 75% isolates shown tetracycline, cotrimoxazole and almost 90-100% isolates were sensitive to norfloxacin, ofloxacin, nitrofurantoin and gentamicin.

As Manic K Shill et al[15] reported that Meropenem showed no resistance with E. coli, Acinetobacter and Klebsiella pneumoniae, in the case of Streptococcus sp. it exhibited resistance of 25%. Amikacin exhibited only 3% resistance with E. coli, whereas no resistance with Acinetobacter and Klebsiella pneumoniae, and most interestingly showed 75% resistance with Streptococcus sp. Gentamicin exhibited no resistance with Acinetobacter while 26.9%, 50% and 87.5% resistance with E. coli, Klebsiella pneumoniae and Streptococcus sp. respectively.

Over 85% of Escherichia coli isolates were sensitive to ciprofloxacin, amoxicillin-clavulanic acid, ceftazidime, nitrofuranton, ceftiraxone, norfloxacin and gentamicin. Klebsiella pneumoniae were 100% sensitive to ciprofloxacin, ceftazidime, ceftriaxone.

The rate of resistance to two or more antimicrobials was 33 (71.7%).[16]

Many studies are going worldwide regarding treatment of asymptomatic UTI among diabetics. Clinical trials dealing with the treatment of ASB in diabetics are limited. In these trials, patients have been treated for periods ranging from 2 weeks to long-term suppression lasting 67 weeks. Many experts in the US recommend treating ASB in diabetic patients because of the frequency and severity of upper UTIs.[17]

CONCLUSION

As Antibiotic Resistance towards various organisms are also reporting more and more now-a-days. Both symptomatic and asymptomatic UTI has to treat in a proper way and diagnosis by culture is must, as poly microbial organisms are usually detect.

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