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ASYMPTOMATIC BACTERIURIA IN FEMALE WITH DIABETES MELLITUS – A PROSPECTIVE STUDY

General Medicine

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KEYWORDS

INTRODUCTION

AIM OF THE STUDY;Diabetes and urinary tract infections are inseparable especially in female, although Asymptomatic bacteriura (ASB) is a major concern in diabetics, there is little information on the occurrence of ASB among diabetics in our Country. Thus, the current study is aimed at investigating the prevalence and aetiology of ASB and antimicrobial resistant pattern of urinary isolates in female diabetic persons in tertiary care medical colleges, in Tamil Nadu ,South India.

MATERIALS AND METHODS; Female Diabetic patients , during their regular visits at diabetic /medical out patient departments in various medical colleges in Tamilnadu and Kerala are randomly selected and taken for study after obtaining informed consent, and details are collected through a questionnaire and lab reports

RESULTS; A total of 246 participants were enrolled into the study The most frequent causative agents of ASB in diabetics were: E.coli 39 (15%), klebsiella sp.18 (7%) Proteus sp. 5(2%), Pseudomonas sp.6 (2%), citrobacter 3(1%) acinobacter 2(1%). More than 50% of the isolated strains were resistant to gentamicin, piperacillin and norfloxacin

CONCLUSION urinary tract infection is a significant cause of morbidity and mortality in diabetic women throughout their lifespan. Serious sequelae include frequent recurrences, pyelonephritis with sepsis, high degree of suspicion in patients with hypo, hyperglycemia is required to identify ASB in diabetic female patients.

THE SPECIAL PROBLEMS FACED BY DIABETIC WOMEN IN OUR STUDY

Problems with diabetes in female workers and homed makers in India are varied and many and are peculiar to Indian women and also the women of developing countries, 90 percent of them never test their bloodsugar EVEN AFTER PHYSICIAN ADVISE, due to fear, poverty, ignorance and or carelessness, education plays a major role in it.Many think ignorance is bliss. Hence awareness should be created first.

The real challenge starts only after diagnosis. Only one third of diagnosed patients will come for next consultation. Others go to native medicines and or to quacks and return only after burning their fingers. only one third of the regular patient who come for follow up is having the blood sugar adequately controlled Of the 264 patients only47(18%) have blood sugar tested monthly and 187(71%) patients tested once in six months or more. 30 (11%)patients tested once in three months In rural patients ,they do lot of physical work, unawareness and even if aware unable to follow the diet, no time for relaxation,179(68%)of employed women skip breakfast 58(,22%) having habits of fasting once a week due to various religious reason ,in order to not waste food, they take the remaining food left in the plate of husband and children, hence they become obese. The greens and vegetables are only served to males and kids , they take only meager amountof greens and vegetables .In non vegetarians , they take one or two pieces of meat chicken, fish or egg once in a week .work spot stress, domestic violence, sleep disturbance,non adherence to diet and drugs due to poverty, cost of the drug ,not able to visit the health facility in proper time ,over crowd in government primary health centers, hospitals and medical college hospitals ,no one to get medicines for them if they are living alone , not able to get medicines because of lack of leave in the work place in working women, change in shift work again causes altered sleep patron sleep disturbance, adding stress ,high cost of private consultation and the newer molecules, hypoglycemia due to older drugs make them to skip the drug and results in high blood sugar level.lack of supervision result in high level of HbA1C,and its complications.

In urban and suburban areas the scenario are different, the obesity plays a major role due to junk foods, tension and lack of exercise. Eating while watching television results in over eating excess calories, lead to obesity, watching serials add tension and keep them in constant stress, many of them ,not even moving from the chair ,remote in one hand and mobile phone in other hand make house wives couch potato and no or very limited physical activity due to availability of plenty of two wheelers,cars,auto, rental ,public and other transport systems, as told by a famous diabetologist they will be more happy if auto rickshaw available to travel from kitchen to dining hall

THE SPECIAL PROBLEMS PREDISPOSING TO UTI IN INDIAN WOMEN OUR STUDY

UTI is more prevalent in women, due to a short urethra that is in proximity to the warm, moist, vulvar, and peri anal areas, that are colonized with enteric bacteria. UTI increases with age, and is also associated with urinary tract abnormalities.

Indian women the cause of ASB and UTI are varied and many to understand this we require to view the problems in socio economic cultural and habit backgrounds.

They are non availability of toilets in many place ,even if available ,un hygienic conditions of toilets, especially public toilets predispose to infections and lead to many problems like UTI , avoiding toilets, drinking less water to avoid visiting toilets, open air defecation, improper washing habits, especially instead of front to back ,washing after defecation many adopt back to front which results in frequent infections especially E.coli in women.

School going children and adolescent girls hesitate to go to toilet due to many social reasons. .prolonged stasis of urine in bladder leads to bacterial growth, reflex, and ascending infections to kidneys. Occupations like lady constables, and those who are in uniformed services are more prone for these problems. These problems worsen during menstrual periods. improper washing of genitals, not able to frequently changing pads ,improper hand washing, hesitation to seek medical advice at an early stage ,due to lack of lady doctors in rural areas, not only in government service but also in private settings

,getting drugs only for few days and stopping antibiotics once symptoms reduced , due to poverty, non accessible to treatment.

After normal delivery episiotomy wound gapping, complete tear in non hospital deliveries, urethral injuries, tears, followed by stricture urethra, vaginal- anal fistulae, all causes complicated UTI in female and cystocele and rectocele, prolapsed of uterus ,rectum, causes stasis of urine and causing bacterial over growth .and UTI mostly ASB Multiple sexual partners, unprotected sex, leucorrhea, sexually transmitted diseases, fungal, bacterial, spirochete and viral infections HIV and genital herpes all make diabetic patients fall prey for UTI and its complications,When diabetes and UTI deadly combination occurs in female it is like sitting on a ticking bomb.

Diabetes has been always associated with urinary tract infections., especially in female.The mechanism of pathogenesis for this association is not fully known, however, it is suggested that high glucose concentration in urine may favour the growth of pathogenic micro-organisms. Asymptomatic bacteriuria is a form of UTI characterized by the presence of significant amount (>105 cfu/ml) of bacteria in urine.

Several studies have documented the association of ASB with diabetes; however, reports on the prevalence of ASB appear contradictory. Most studies reported the prevalence to be higher in people with diabetes than people without diabetes.

In the Netherlands, a prevalence of 26% among women with diabetes compared to 6% in non-diabetic women was reported.ASB was also reported in 13.7 % of diabetic women in Tanzania; 20 % in Iran and 36.2 % in Nigeria.The variations have been attributed to differences in the screening test, geographical region and ethnicity Although E. coli is known to be the most common uro pathogen, other micro-organisms are emerging with predominance in cases of ASB. changing pattern of ASB with Klebsiella sp accounting for the majority (42.4%) of asymptomatic bacteriuria among diabetics. Antibiotic resistance of uro-pathogens is increasingly being reported with high occurrence of multiple drug resistant

MATERIALS AND METHODS

A total of 264 participants were enrolled into the study. Diabetic patients were enrolled into the study during their regular visits at clinics in Diabetic OP in Government Medical College Hospitals in Tamil Nadu. Criteria for inclusion were age > 18 years; Exclusion criteria included pregnancy; history of any underlying illness; signs and symptoms of UTI and antibiotic/antimicotic usage within one week. Diabetic status was further confirmed using IDF standards; diabetes (FBS > 126mg/dl and or the use of hypoglycemic drugs). A questionnaire was administered to collect demographic and clinical data from participants and specimens were collected only from consented subjects.

The study participants were educated on how to collect a “clean-catch” midstream urine specimen and the importance to avoid contamination. They were advised on washing of hands prior to collection and labia separation, especially in females. Participants who had difficulties collecting their specimens were assisted by trained personnel. Urine samples were collected into sterile containers, placed in a cool box (4°C) and transported to the laboratory within 2 hours. The samples were then stored in a refrigerator and analysed within 8 hours of collection. Each sample was separated into two parts under sterile conditions; one part for urinalysis and the other for culture.Wet preparation of centrifuged urine was observed using 40 times objective lens to detect blood, pus and other cells. A calibrated 10µl wire loop was used to inoculate uncentrifuged urine into MacConkey, blood and Sabouraud's agar and plates incubated aerobically at 37°C for 24 hours. Significant ASB was defined as urine culture of > 105 cfu/ml without symptoms of cystitis.3 Isolates were identified using standard biochemical techniques.

Antimicrobial susceptibility testing was done by the Kirby Bauer disk diffusion method using standard procedures. Disks of commonly used drugs against yeasts, Gram positive and negative organisms were selected. These included; nalidixic acid, nitrofurantoin, ceftriaxone, cefuroxime, doxycycline, ciprofloxacin, chloramphenicol, gentamicin, cefuroxime cotrimoxazole, vancomycin, doxycycline, oxacillin, erythromycin, augmentin, nystatin, ketoconazole, miconazole, flucytosine and fluconazole (Liofilchem, Roseto, Italy). The plates were incubated aerobically at 37°C for 18 hours after which the zones of inhibition were measured in milliliters and recorded as previously reported.

RESULTS: Of 410 enrolled patients. The most frequent causative agents of UTI in diabetics were: E.coli (respectively, 15%), klebsiella sp. (7%) Proteus sp. (2%), Pseudomonas sp. (2%), citrobacter(1%) acinobacter(1%). More than 50% of the isolated strains were resistant to gentamicin, piperacillin and norfloxacin.

Once the diagnosis of UTI is suspected, a midstream urine specimen should be examined for the presence of leukocytes, as pyuria is present in almost all cases of UTI. Pyuria can be detected either by microscopic examination (defined as ≥10 leukocytes/mm3), or by dipstick leukocyte esterase test (sensitivity of 75%–96% and specificity of 94%–98%, as compared with microscopic examination, which is the gold standard). An absence of pyuria on microscopic assessment can suggest colonization, instead of infection, when there is bacteriuria. Microscopic examination allows for visualizing bacteria in urine. A dipstick also tests for the presence of urinary nitrite. A positive test indicates the presence of bacteria in urine, while a negative test can be the product of low count bacteriuria or bacterial species that lack the ability to reduce nitrate to nitrite (mostly Gram-positive bacteria). Microscopic or macroscopic hematuria is sometimes present, and proteinuria is also a common finding.

A urine culture should be obtained in all cases of suspected UTI in diabetic patients, prior to initiation of treatment. The only exceptions are cases of suspected acute cystitis in diabetic women who do not have long term complications of diabetes, including diabetic nephropathy, or any other complicating urologic abnormality. However, even in these cases, if empiric treatment fails or there is recurrence within 1 month of treatment, a culture should be obtained. The preferred method of obtaining a urine culture is from voided, clean-catch, midstream urine. When such a specimen cannot be collected, such as in patients with altered sensorium or neurologic/urologic defects that hamper the ability to void, a culture may be obtained through a sterile urinary catheter inserted by strict aseptic technique, or by suprapubic aspiration. In patients with long-term indwelling catheters, the preferred method of obtaining a urine specimen for culture is replacing the catheter and collecting a specimen from the freshly placed catheter, due to formation of biofilm on the catheter.

The definition of a positive urine culture

The definition of a positive urine culture depends on the presence of symptoms and the method of urinary specimen collection, as follows and as depicted in Figure 1 For the diagnosis of cystitis or pyelonephritis in women, a midstream urine count ≥105 cfu/mL is considered diagnostic of UTI. However, in diabetic women with good metabolic control and without long-term complications who present with acute uncomplicated cystitis, quantitative counts <105 colony-forming units [cfu]/mL are isolated from 20%–25% of premenopausal women and about 10% of postmenopausal women. Only 5% of patients with acute pyelonephritis have lower quantitative counts isolated. Lower bacterial counts are more often encountered in patients already on antimicrobials and are thought to result from impaired renal concentrating ability or diuresis, which limits the dwell time of urine in the bladder. Thus, in symptomatic women with pyuria and lower midstream urine counts (≥102 cfu/mL), a diagnosis of UTI should be suspected.

RESULTS OF OUR STUDY

STUDY POPULATION	264	
Microscopic pus cells above 10	107	(26%)
below 10	303	(74%)

Duration of diabetes mellitus

Less than 5 years	90 (22%)	MORE than 5 years	174	(88%)
PPBS below 200 mg/dl			10	04%
201-300 mg/dl			16	06%
301-400 mg/dl			39	15%
Above 4oo mg/dl			03	01%
HbA1C above 7			201	76%
Below 7			63	24%

Symptoms	numbers	percent
Urgency,precipi, dysuria,fever with chills	42	16%
Supra.pubic tender	51	19%
Loin pain	18	7%
A symptomatic	16	6.%

ORGANISM	PERCENT	HIGHLY SENSITIVE	MODERATELY SENSITIVE	RESISTANT
E.COLI	15	CFS.PIT,MRP	AK NIT	G,CIP,COT,NX,CTX
KLEBSIELLA	07	CFS.PIT,MRP	AK NIT	G,CIP,COT,NIT,CTX,NX
PSEUDOMONAS	02	CFS.PIT,MRP	TOB,AK NX	G,CIP,CAZ,CTX
ACINOBACTER	01	CFS.PIT,MRP		AK,G,COT,NX,NIT CTX
PROTEUS	02	CFS.PIT,MRP	AK,NIT	G,CIP,CAZ CTX
CITROBACTER	01	CFS.PIT,MRP	COT	AK,G,CIP.NIT,CTX

CFS-CEFOPERAZONE SULBACTUM ,PIT-PIPERCILLIN TAZOBACTUM MRP-MEROPENUM G-GENTAMYCIN ,AK-AMIKACIN, COT-COTRIMOXAZOLE, NX-NALIDIXICACID, NIT-NITRO FURONTOIN,CIP=CIPROFLOXACIN CTX-CEFATOXIDINE,CAZ-CEFAZOLINE

CONCLUSION;,urinary tract infection is a significant cause of morbidity and mortality in diabetic women throughout their lifespan, Serious sequelae include frequent recurrences, pyelonephritis with sepsis, renal damage complications of frequent antimicrobial use including high-level antibiotic resistance and Clostridium difficile colitis. High recurrence rates and increasing antimicrobial resistance among uropathogens threaten to greatly increase the economic burden of this common infection. It has become increasingly evident that prophylactic use of antibiotics to prevent UTI is not a sustainable solution. The high incidence and recurrence rate of UTI, along with the rapid rise of MDR uropathogens , necessitate new drugs and vaccine therapies for the prevention of these infections.ASB and UTI .

The diagnosis of ASB and UTI should be suspected in any diabetic patient with type 2 diabetes and ASB or UTI might present with hypo- or hyperglycemia, non-ketotic hyperosmolar state, or even ketoacidosis, all of which prompt a rapid exclusion of infectious precipitating factors, including UTI

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