

Study of Bacteriological Profile of Urinary Tract Infections in Diabetic Patients

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Abstract-

Introduction: Diabetes mellitus is a set of metabolic disorder that under-utilizes glucose thus resulting in hyperglycemia. Not only is UTI common, but the range of possible clinical syndromes it can produce is exceptionally broad, including pyelonephritis with gram-negative sepsis, asymptomatic bacteriuria.

Aims & Objectives: To study the bacteriological profile of urinary tract infection in diabetic patients. To study the antibiotic sensitivity profile of the isolates from the urine culture of diabetic patients.

Materials & Methods: A hospital based study was carried out in 100 patients who were attending outpatient department or admitted in the department of medicine MMIMSR Mullana, Ambala. The study included cases of diabetes with above age of 18 years and clinically suspected cases of UTI.

Results : In our study, maximum numbers of patients were in the age group of 51-60

years. Female preponderance was observed 58%, and male 42% out of total 100 patients. The male: female ratio in our study was 1:1.38. “E. coli” was the most common microorganism found in diabetes 72%. Amikacin (89.36%) & Nitrofurantoin (85.11%) were found to be most sensitive antibiotic therapy.

Conclusion – Complications of UTI like bacteremia, renal abscess, renal papillary necrosis and resistance occur more frequently among diabetes patients as compared to non-diabetic patients.

Key words- urine, culture, diabetes, infection, antibiotics

Introduction- Most urinary tract infections in diabetes patients are relatively asymptomatic. The presence of diabetes predisposes to much more severe infection, especially in patients with poor diabetes control, acute ketoacidosis, or diabetes complications such as nephropathy, vasculopathy and neuropathy. This



asymptomatic infection can lead to severe kidney damage and cause renal failure. ^[1]

Acute urinary tract infection is more common in women due to the short urethra readily accessible to organisms from the vagina and rectum. ^[2,3] Classification of UTI according to type of infection ^[4] Symptomatic UTI, Asymptomatic UTI – Acute, Recurrent, Chronic, Complicated, Uncomplicated. Localization of UTI- (a) Infection of upper urinary tract ^[5] a. Acute pyelonephritis, b. Chronic pyelonephritis, (b) Infection of lower urinary tract ^[6] a. Cystitis b. Urethritis. Complications of UTI like bacteremia, renal abscess, renal papillary necrosis and resistance occur more frequently among diabetes patients as compared to non diabetes patients. ^[6]

Material and methods- A hospital based study was carried out in 100 patients who were attending outpatient department or admitted in the department of medicine MMIMSR Mullana, Ambala during the period DECEMBER 2013 to MAY 2015. Patients included with all cases of diabetes of age above 18 years and clinically suspected cases of UTI.

DATA COLLECTION - The following data was collected: Name , age , sex , date of admission , FPG and RPG on presentation and admission , clinical parameters like fever , dysuria , urgency , bladder fullness , suprapubic tenderness , flank pain , haematuria , TLC , RFT , urine

routine and microscopy , urine culture , antibiotic sensitivity pattern. Criteria for diagnosis of Diabetes mellitus - Symptoms of diabetes plus random plasma glucose concentration ≥ 11.1 mmol/l (200 mg/dl) or Fasting plasma glucose ≥ 7.0 mmol (126 mg/dl). The exclusion criteria was non diabetic patients, below the age of 18years and with a prolonged indwelling urinary catheter.

METHOD - Urine samples from patients presenting in the outpatient department and admitted in various medical wards were taken. In females, the periurethral area and perineum were first cleaned with two or more gauze pads saturated with soap and water, using forward to back motion, followed by rinse with sterile saline and water. The labia were held apart during voiding and the first few milliliter of urine was passed in to a bed pan to flush out bacteria from the urethra. The mid stream urine was then collected in a sterile, wide mouth container closed with tightly fitted lid. In males, prepuce was retracted and the glans penis was cleaned with wet cotton. The mid stream portion was then collected in a sterile wide mouth container.

SAMPLE PROCESSING - The uncentrifuged urine specimen will be inoculated on MacConkeys agar, blood agar and incubated at 37 C for 18 to 24 hrs. Semi quantitative calibrated loop method will be used and results will be



interpreted using Kass concept. Inoculating loop of 4mm internal diameter holds 0.01 ml of urine. No. of bacteria / ml = No. of colonies x dilution factor (100). Interpretation - $\geq 10^5$ CFU/ml - Significant. The growth obtained will be identified by colony characteristics, gram stain and biochemical reaction. Antibiotic sensitivity testing will be done by Kirby Bauer disc diffusion method on Mueller Hilton agar.

Observations - The mean age group of patients was 57.06 ± 14.2 . The male: female ratio was 1: 1.6, signifying that females are prone to UTI in diabetes. 42 % of the patients had prior history of UTI, signifying the higher chances of recurrence of UTI in diabetic patients. Fever (62 %) was the most common presenting clinical symptom in our study. The mean TLC recorded in our patients was 14063 with sepsis being present in 71 % of the patients. The mean creatinine (mg/dl) in our group was 2.303, which can be explained by; being a tertiary care hospital, most of patients getting admitted had complications. Gram negative bacteria (65 %) were more common than Gram positive bacteria (35 %) in our study. E.Coli (47%) was the most common gram negative uropathogen. Amikacin (89.36%) was the most sensitive antibiotic against E.coli. S.aureus (14%) and Enterococcus (14%) were the most common gram positive

uropathogens. Linezolid (14%) was most sensitive to S.aureus and enterococcus. Amikacin (72.30%) was the most sensitive drug against Gram negative bacteria. Linezolid (62.85%) was the most sensitive drug against Gram positive bacteria. Ciprofloxacin 52.30% and 65.71% was the most resistant antibiotic in gram negative and gram positive respectively. Gentamycin 36.9 % and 42.85% was the second most resistant antibiotic in gram negative and gram positive respectively.

Discussion – Horcajada JP et al conducted a study in 2003^[7], to investigate if there is relevant difference in clinical, microbiological & outcome characteristics of community acquired UTI between diabetes & non diabetes patients as shown in Table A. It states that mean age was 67.9 years. & there was a predominance of women. History of urinary incontinence was significantly more frequent in diabetes group (P=0.02). they showed incidence of bacteremia due to all microorganisms was increased two-fold in diabetes patients. Similar studies were conducted which also showed bacteremia being more common in diabetes patients. Paget G et al ^[8] had shown that in nosocomial UTI, E coli was the most common microorganism (50%). The other microorganism isolated were Klebsiella spp Pseudomonas spp S. aureus, S. epidermidis, Enterococcus spp, S.saprophyticus. Amikacin had maximum



sensitivity to E. coli, 89% . The other antibiotics with decreasing order of sensitivity were Amikacin 89.36%, Nitrofurantoin 85.11%, Imipenem 82.98%, Gentamicin 80.85%, Piperacillin/Tazobactam 78.72%, Ampicillin 70.21%, Cotrimoxazole 68.09%, Meropenem 68.09%, Tetracycline 65.96% & Ciprofloxacin 55.31%.

Similar observation was made by Taslima TL et al ^[9] have shown Carbapenam having 100% sensitivity followed by Aminoglycosides. Enterococcus fecalis and staphylococcus aureus were the second most common organisms found in our study. E. fecalis (14%) was found to be most sensitive against linezolid (85%), then nalidixic acid (71.4%) and vancomycin (64%). Resistance to vancomycin in E.fecalis is becoming more common. ^[10,11].

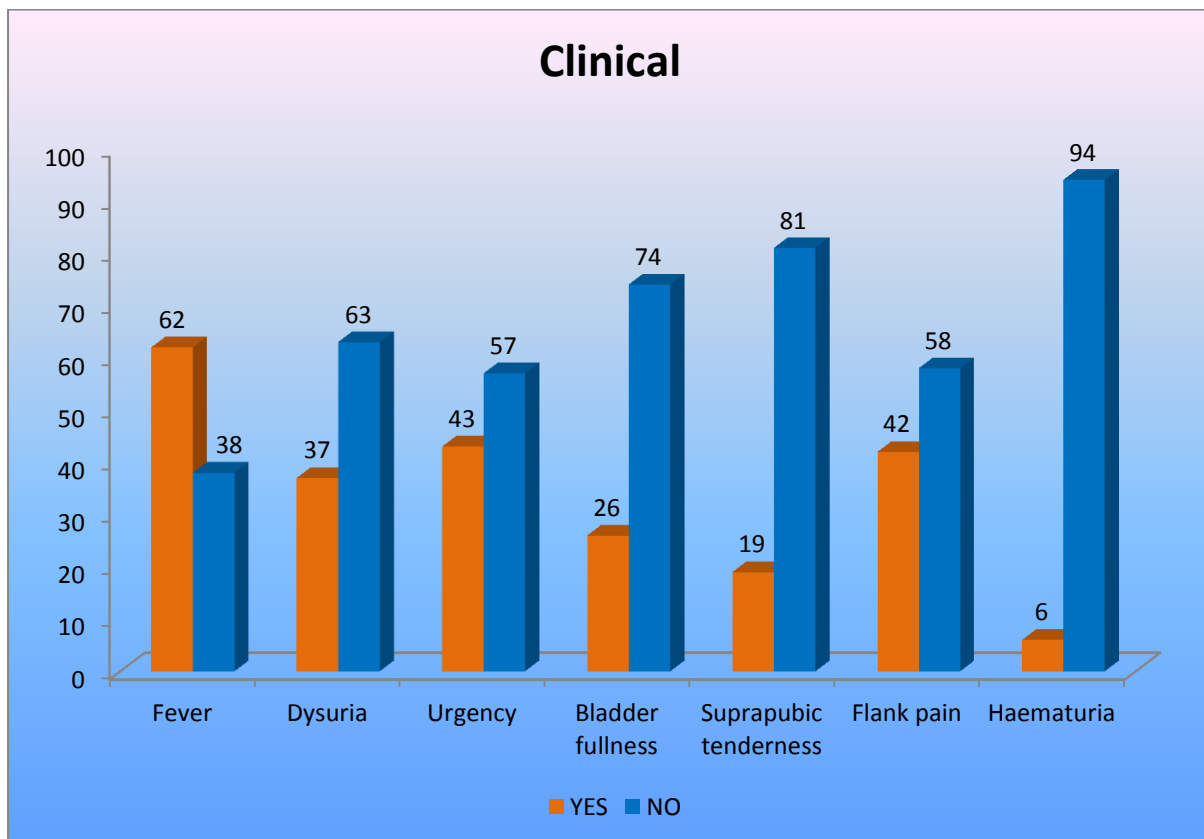
Summary and Conclusion - In our study we found strong correlation of UTI in diabetes due to certain predisposing factors. The 42 % of the patients had prior history of UTI, signifying the higher chances of recurrence of UTI in diabetic patients. E.Coli (47%) was the most common gram negative uropathogen. Amikacin (89.36%) was the most sensitive antibiotic against E.coli. Amikacin (72.30%) was the most sensitive drug against Gram negative bacteria. Linezolid

(62.85%) was the most sensitive drug against Gram positive bacteria.

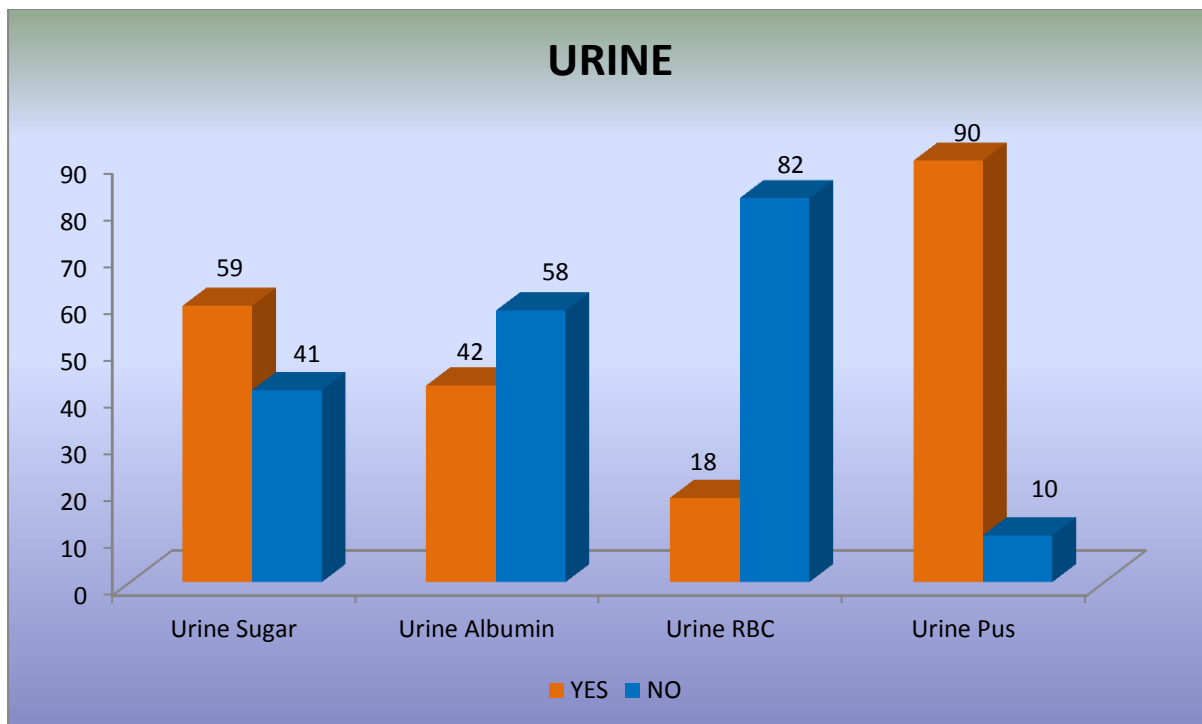
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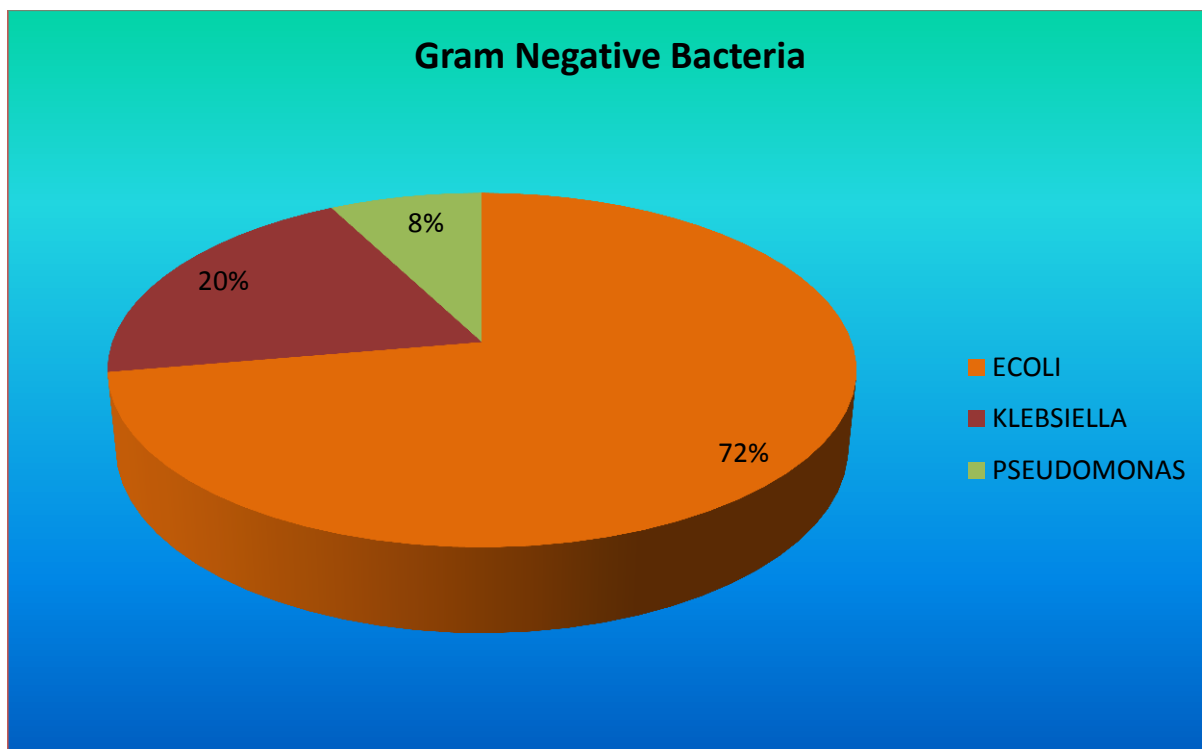
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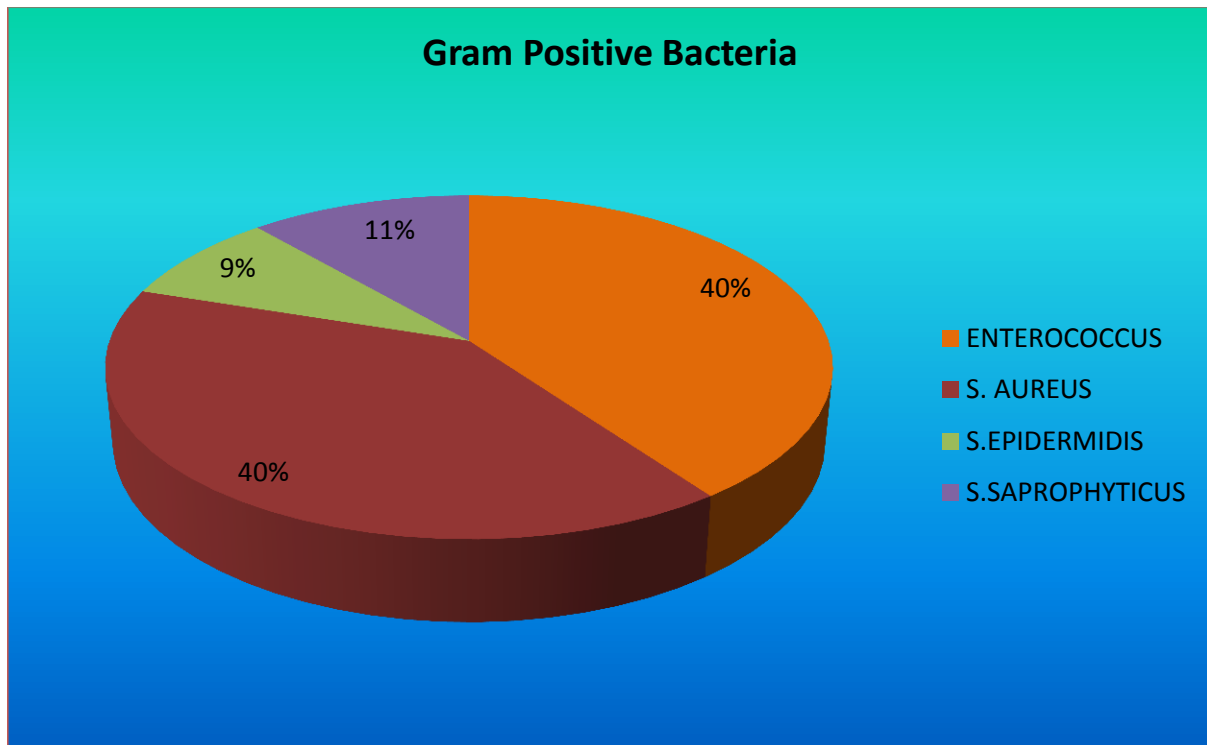
CLINICAL PROFILE OF PATIENTS



MACRSCOPIC URINE EXAMINATION OF PATIENTS



Depicting the distribution of gram negative bacteria isolated (N=65). E.coli 72%, Klebsiella 20%, Pseudomonas 8% respectively.



Depicting the distribution of gram positive bacteria isolated (N=35). S. Aureus 40% , Enterococcus 40% , S. saprophyticus 11% , S. epidermidis 9% respectively.