

Prevalance of pyuria in diabetic patients at a tertiary care hospital in Karachi, Pakistan: an observational study

Asifa Khurram, Khurram Danial, Kamal Ahmed, Zain Ali

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Abstract

Object: The aim of our study is to determine the prevalence, frequency and predisposing factors to pyuria in diabetic patients both sterile and due to urinary tract infections.

Method: The type of study is a prospective observational study done for a period of three months from April 2015 to June 2015 at a tertiary care hospital in Karachi Pakistan. The inclusion criteria was all the patients above 18 years of age, who were diagnosed cases of diabetes and had pyuria (defined as 4 or more than 4 pus cells per HPF) and had a urine culture and sensitivity test done. A sample size of 100 patients was taken by using the convenient method, patient demographics and other variables were noted in a proforma and all the patients signed an informed consent to be included in the study, data analysis was done on SPSS version 23.

Results:

Conclusion: According to the results of our study more than half of patients who are diabetic and have pyuria have a culture positive urinary tract infection, UTI is more common in females, and those having anatomic and functional defect of the kidneys, bladder or the urethra.

keywords: Urinary tract infection, pyuria, diabetes mellitus, sterile pyuria.

Abbreviations: Urinary tract infection (UTI), Urine detailed report (UDR), benign prostatic hyperplasia (BPH).

Introduction:

Urine detailed report is a first line test for screening of a number of diseases of the renal system, and any of the other diseases which may show anomalies in the urine. Pyuria is defined as the presence of pus cells in the urine, which is an important adjuvant with bacteriurea in patients having a UTI, it is considered to be significant when the number of pus cells are more than 4 per high power field in a urine sample that is centrifuged. Pyuria accompanied with positive nitrite and bacteria is highly suggestive of a urinary tract infection. While sterile pyuria is defined as presence of pyuria without the evidence of infection on culture of urine. Sterile pyuria might be due to a number of organisms which are not routinely picked up by the culture me-

dium that is commonly used, one such example is genitourinary tuberculosis^{1,2} and organisms such as Chlamydia, urea plasma urealyticum³, some systemic diseases might also present with sterile pyuria like SLE, Kawasaki disease, sickle cell disease and reiters syndrome^{4,7}. Some anatomic abnormalities can also present with sterile pyuria like stone disease, incontinence, indwelling catheter, neoplasms, renal papillary necrosis, polycystic kidney disease, tubulointerstitial nephritis and after treatment with antibiotics or an inadequately treated urinary tract infection^{8,9}. According to a study done in Saudi Arabia and prevalence of UTI in diabetic population is around 25.3%, and a study from Italy reports presence of asymptomatic bacteriurea in the diabetic patients¹¹. There is no definitive guideline

Karachi Medical and Dental College, Karachi
A Khurram
K Danial

Liaquat National Hospital Karachi
K Ahmed

Civil Hospital Karachi
Z Ali

Correspondence:
Dr Zain Ali
email: drzainali88@gmail.com

Table 1: Patient demographics

	Pyuria with UTI	Sterile pyuria	Total number of patients
Number of patients	61 (61%)	39 (39%)	100
Age	54.99 ± 11.69	55.23 ± 9.78	50.88 ± 18.56
Male : Female	1:2.26	1:1.36	1:1.94
OPD cases	47	34	81
In patient cases	14	5	19
Duration of diabetes	6.86 ± 6.05	7.46 ± 6.51	7.45 ± 6.49

Table 2: Clinical parameters of the patient population

	Pyuria with UTI n=61	Sterile pyuria n=39
Benign prostatic hyperplasia	5 (8.19%)	1 (2.56%)
Hx of UTI	37 (60.65%)	20 (51.28%)
Fever	29 (47.54%)	12 (30.76%)
Flank pain	17 (27.85%)	9 (23.07%)
Lower urinary tract symptoms	40.65 (0.57%)	17 (43.58%)

Table 3: Results of laboratory tests

	Pyuria with UTI n=61	Sterile pyuria n=39
HbA1C	6.0 ± 4.7	7.2 ± 3.9
Glucosuria	18 (29.50%)	14 (35.89%)
Proteinuria (dipstick method)	42 (68.85%)	20
Nitrite positive (dipstick method)	9 (14.75%)	1 (2.56%)
Obstruction on ultrasound	9 (14.75%)	1 (2.56%)
Creatinine (plasma)	1.72 ± 1.24	1.55 ± 2.3

on the evaluation of diabetics having pyuria due to UTI and sterile pyuria, more over the prevalence of sterile pyuria, association of pyuria in diabetics and the definitive treatment modality is also not well defined in the literature, for these purposes our study was designed so that it may help further propagate the process of designing protocols for pyuric diabetic patients.

Materials and Methods:

The type of study is a prospective observational study done for a period of three months from April 2015 to June 2015 at a tertiary care hospital in Karachi Pakistan. The inclusion criteria was all the patients above 18 years of age, who were diagnosed cases of diabetes and had pyuria (defined as 4 or more than 4 pus cells per HPF) and had a urine culture and sensitivity test done, both the tests were collected at the same time. The patient population was selected from both in patient and outpatient units. A sample size of 100 patients was taken by using

the convenient method, patient demographics and other variables (type of diabetes, duration, symptoms and signs of UTI, fever, flank pain, stone disease, BPH, and other co morbid) were noted in a proforma. Other laboratory investigations like complete blood picture, HbA1c levels, creatinine, blood urea nitrogen, and ultrasound kidneys, bladder and ureter was also done in all the patients. The sample of urine was analyzed on a duri urine analyzer, centrifugation of the sample was done at 2,500 rotations per minute for a time duration of 5 minutes. Microscopic analysis was done at high power field for cell counts, the culture of the sample was on cystein, dextrose deficient agar and lactose for 24 hours. All the patients signed an informed consent to be included in the study, data analysis was done on SPSS version 23.

Results:

The final study population consisted of 100 patients, the mean HbA1C values of the study population was 6.62 ± 4.205, BPH was found in n=6 patients, while n=57 patients had a past history of culture positive urinary tract infection. Presence of flank pain was in n=26 patients, while fever was found in n= 41 patients. Table 1 shows the various aspects of the patient demographics, while table 2 demonstrates the various clinical parameters of the patient population. Table 3 shows the various laboratory investigations done on the diabetic patients. The results show that in our study population urinary tract infection was more common in the females and in those patients who had signs and symptoms of UTI. The patients who had UTI concomitantly had more proteinuria, higher levels of serum creatinine, obstructed urinary tracts, nitrite positivity in the urine using the dip stick method.

Discussion:

The frequency of urinary tract infection in the diabetic population is 25.3%, out of these 41.1% of the patients were females¹⁰ in our study the frequency of UTI was in 61% of the diabetic patient, which might be due to the selection criteria we used in our study that is the patient

population solely consisted of pyuria positive diabetic patients. Currently no treatment is done for asymptomatic bacteriurea in diabetic patients¹², the UTI is more likely in symptomatic pyuric diabetic patients¹³, early detection and treatment is done to prevent renal abscess and pyelonephritis¹⁴. In patients who have enlarged prostate or have past history of UTI, the current pyuria is more likely to be due to present UTI when symptoms start to appear, and the same is true for patients who have obstructions in the renal system, which is also consistent with other studies^{9,13}. In our study females were more prone to develop UTI with a male to female ratio of 1:2.26 which is also consistent with other studies¹⁵. But this difference of genders was not observed in sterile pyuria where the male to female ratio was 1:1.36, but this lack of gender discrimination when it comes to sterile pyuria is not well documented. In our study one patient was found to have an obstruction of the renal system as found on ultrasonographic examination and that was associated with sterile pyuria, a few other diseases are also found to be associated with sterile pyuria like reiters syndrome, SLE, indwelling catheter, Kawasaki disease, stone disease, renal papillary necrosis, but these were not found in our study population^{8,9}. A recently done study reveals that the prevalence of sterile pyuria in genitourinary tuberculosis is 19%¹⁶, but our study cannot definitely conclude the higher prevalence of sterile pyuria in diabetics as compared with the general population, as that will require a more controlled, randomized and a comparative study. A study done in Italy reveals the asymptomatic bacteriurea in diabetics¹¹. According to the results of our study it is suggested that in the diabetic population symptomatic pyuria be treated specially in the females and those who have anatomical and function anomalies of the renal system.

Conclusion:

According to the results of our study more than half of patients who are diabetic and have pyuria have a culture positive urinary tract infection, UTI is more common in females, and those having anatomic and functional defect of the kid-

neys, bladder or the urethra.

Conflict of Interest: None

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Role and contribution of authors:

Dr Asifa Khurram, Senior Registrar Department of Nephrology, Karachi Medical and Dental College, Concept, Study Design, Organizing draft, Manuscript writing

Dr Khurram Danial, Assistant Professor Nephrology, Karachi Medical and Dental College, Concept, Study Design, Organizing draft, Manuscript writing

Dr Kamal Ahmed, Assistant Professor Department of Medicine, Liaquat National Hospital Karachi, Data collection, Final layout, Design of study

Dr Zain Ali, House officer, Civil Hospital Karachi, Manuscript writing, Data entry & analysis

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