

Relation between Pyuria and Bacteriuria in Urinary Tract Infections

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Abstract

Introduction: As urinary tract infections are very common in all age groups and its prevalence is increasing due to various factors like poor hygiene, increasing prevalence of diabetes and injudicious use of antimicrobials. Some patients have significant pyuria with bacteriuria, some have only pyuria without bacteriuria, while some have bacteriuria without pyuria. This study was conducted to find relationship between pyuria and bacteriuria in patients with urinary tract infections. **Materials and methods:** Urine samples from 100 patients were taken out of which 71 were females and 29 were males. Routine microscopy of urine samples was done and WBC count of more than 5/HPF was taken significant. Urine samples were processed according to guidelines and cultured on Hichrome UTI agar, Macconkey agar and Blood agar which was incubated at 37°C. The organisms which grew on them were biochemically confirmed. **Results:** Out of 100 urine samples 40 showed significant pyuria and 60 showed insignificant pyuria. 21 were culture positive with significant pyuria and 19 were culture negative. **Conclusion:** In conclusion as number of pus cells increases on urine microscopy yield of bacteria on culture media also increased.

Keywords: UTI; Pyuria; Bacteriuria; Culture.

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Introduction

Urinary tract infection (UTI) is most common cause of morbidity and mortality in the world [1]. It is more common in women than in men. The prevalence of bacteriuria is more in female population with at least 10-20% of females experiencing a symptomatic UTI episode some point of time during their lifespan [2,3].

The most widespread reference method for UTI diagnosis is conventional urine culture with no less than 100,000 colony forming units per millilitre. The diagnostic accuracy of microscopic urine analysis for suspected UTI has been studied extensively but diagnosis by this conservative method has varied widely depending on patient population and laboratory techniques.

Urinary tract infections are spectrum of disease caused by microbial invasion of genitourinary tract that extends from the renal cortex of the kidney to urethral meatus [4]. The presence of pyuria and bacteriuria are the two most important indicators of urinary tract infections [5]. Pyuria is defined as presence of white blood cells (WBC's) in person's urine [6].

In patient with diabetes, enteric fever or bacterial endocarditis, bacteriuria without pyuria may occur [7]. Pyuria with a sterile routine culture may be found in renal tuberculosis, gonococcal urethritis, chlamydia trachomatis infections and leptospirosis [8].

Pyuria can occur in absence of apparent bacterial infection, particularly in patients who have already taken antimicrobials those with renal calculi, urethral stricture, genitourinary neoplasm and glomerulonephropathy. In female patients pyuria can occur due to leucorrhoea, fever, pregnancy and administration of steroids.

Methods

A total of 100 clean catch mid stream urine samples were collected from patients presenting to outpatient department with urinary symptoms after obtaining informed consent. Specimen collection, culture, identification tests were done according to established guidelines. 10-15 ml of urine sample was collected in a sterile centrifuge tube and centrifuged at 5000 rpm for 5 minutes. The supernatant was discarded. The sediment was then examined under the microscope for the presence of pus cells. Pus cells >5/HPF were considered as significant. Urine culture was done on hichrome uti agar, blood agar and macconkey agar according to standard laboratory methods. Culture plates were observed for bacterial growth after 18-24 hrs of incubation at 37°C aerobically. Identification of bacteria was based on colony morphology, gram stain, biochemical reactions and pigmentation on hichrome uti agar. Bacterial colonies >10⁵ colony forming units per ml. of urine were considered significant.

Results

Of 100 patients from whom urine samples were collected, 71 were females and 29 were males. Among 100 samples 40 samples showed significant

Table 1: distribution of Pyuria and Bacteriuria

Pyuria	Culture Positive	Culture Negative
>5WBC/HPF	21	19
≤5WBC/HPF	5	55

Table 2: Comparison between Pyuria and Bacteriuria in cases of UTI

No. of Pus cells	No. of Samples	Culture Positive	Culture Negative
0-5	60	5	55
6-10	28	12	16
>10	12	9	3

Table 3: Significant and insignificant pyuria causing bacterial organisms

Organism	Significant Pyuria	Insignificant Pyuria
E.coli	10	2
Klebsiella pneumonia	3	0
Staph. Aureus	1	0
Enterococcus faecalis	5	0
Proteus vulgaris	1	2
Pseudomonas aeruginosa	1	0
Staph. Saphrophyticus	0	1

pyuria and 60 samples showed insignificant pyuria. Out of 40 samples which showed significant pyuria 21 were culture positive and 19 were culture negative while 5 out of 60 samples with no significant pyuria were culture positive (Table 1-3).

Discussion

Out of 40 urine samples which showed pyuria only 21 showed significant bacterial growth. In 60 urine samples without significant pyuria only 5 showed significant bacterial growth. In the present study, pyuria (>5wbc/HPF) was detected in 40 samples out of which only 21 were culture positive. This suggests that pyuria alone cannot be used for detecting bacterial pathogen in patients with significant bacteriuria [9]. Macdermott concluded that there was no correlation between degree of pyuria and bacteriuria in urine culture. Further Bachmann concluded that pyuria on urine microscopy was poor in identifying asymptomatic bacteriuria [10]. Goosesens reported that asymptomatic bacteriuria cannot be accurately predicted by microscopic examination. Wammanda found positive urine culture with significant bacteria 24.3%, urine microscopy for significant leucocyturia had a sensitivity of 51.1% [11]. On the other hand shaw reported that urine WBC's count was sensitive in detecting UTI [12].

Our study showed as the number of pus cells increased per HPF the chance of culture positivity was also high. In this study criteria for pyuria >5 pus cells /hpf was made according to stamm, wright [13,14].

Commonest organism which was isolated was E.coli, out of which 10 showed significant pyuria and 2 showed nonsignificant pyuria which is similar to the finding conducted by Anjila et al [15]. In this study significant bacterial growth was found as the number of pus cells /HPF increased which is in accordance with the study conducted by Dhakal et al. [16].

References

- Wein AJ, Kavoussi LR, Novick AC, Partin AW. Urinary tract infection. In: Campbell Walsh urology 10th ed, london:saunders; 2011 p 257-326.
- Urology channel online. urinary tract infection. Last update june 2006.
- Sobel JD, Kaye D. Urinary tract infections. In: Mandell gl, Douglas RG, Bennett JE eds. Principles and practice of infectious diseases, 3rd edition p.588.

4. Mahon CP, Lehman DC and manuselis G. Textbook of diagnostic microbiology. An imprint of Elsevier 2007. pp.1010-28.
 5. Douri FE. Prevalance of silent bacteriuria in patients with diabetes mellitus. The iraqi postgrad med J 2008;7:60-64.
 6. Adegoke AO, Bamigbowu OE, Ayodele MBO and blankson CD. Prevalence of asymptomatic bacteriuria in prostatitis subjects attending university of port harcourt teaching hospital Afr J of microbial Res. 2012;6(21):4443-48.
 7. Kattel HP, Mishra SK, Acharya J, Shah As, Rijal BP and pokharel BM. Relationship between pyuria and bacteriuria in suspected urinary tract infection. JNAMLS 1009;10:19-21.
 8. Juliana conrad dos santos, Liliana portal weber. Evaluation of urinalysis parameters to predict uti . Braz J infect dis. 2007;11:11-13.
 9. Macdermott RIJ. The interpretation of midstream microscopy and culture results in women who present acutely in labour ward. BJOG 1994;712:1974.
 10. Bachman JW, Heise RH, Nossents JM. A study to detect asymptomatic urinary tract infections in obstetric population. JAMA 1993;270(11):1971-74.
 11. Wammanda RD, Ogala WN. Use of nitrite dipstick in screening for urinary tract infection in children. West african journal of medicine. 2000;19(3): 2016-208.
 12. Shaw KN, MC gowan KL. Screening for urinary tract infection in infants in emergency department. Pediatrics 1998;101(6):1-5.
 13. Wright WT. Cell counts in urine. Arch of inter med 1959;103:76.
 14. Stamm WE, Wright KF. Causes of acute urethral syndrome in women. N Eng J Med. 1980;303:409.
 15. Dongol A, Joshi DM and gautam A. Detection of pyuria versus bacteriuria in suspected patients of uti. Nepal journal of science and technology. 2014; 15:129-32.
 16. Dhakal BK, pokharel Bm. microscopic detection of urinary tract infections in nepalese patients. J Microbiolo. 2002;40:267-73.
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