



PREVALENCE OF ASYMPTOMATIC BACTERIURIA AMONG ANTENATAL WOMEN AND IDENTIFICATION OF BACTERIA IN URINE

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ABSTRACT

The present study was carried out on pregnant women between 20-24 weeks of gestational age attending antenatal clinics at *Rajkiya Mahila Chikitsalya*, Ajmer, Rajasthan, India during a period of one year to find out prevalence of asymptomatic bacteriuria and to identify the most common causative agents among the isolated microorganisms. All women were subjected to complete urine examination and urine culture to find out asymptomatic bacteriuria (ASB) and were categorized as urine culture positive and urine culture negative. Out of total patients screened, 10.66 % patients were found urine culture positive and 89.33% patients were found urine culture negative. Prevalence of asymptomatic bacteriuria was 10.66% in present study. Incidence of asymptomatic bacteriuria was higher in 23-27 year of age group and was 43.75%. Prevalence of asymptomatic bacteriuria was marginally higher among primigravidas (56.25%). Pyuria as a screening test had sensitivity of 56.25% and specificity of 96.27%. On the basis of upshot of the present study, it can be stated that urine microscopy is not a reliable screening test to diagnose asymptomatic bacteriuria. The most common organism found was E.Coli to be associated with asymptomatic bacteriuria. In present study it was found in 87.5% of culture positive patients. Urine culture can be considered as the gold standard test for the diagnosis of ASB. It is suggested that all women attending antenatal clinics should be subjected to urine culture at 20-24 weeks of gestation, so that symptomatic bacteriuria can be detected well in time. Asymptomatic bacteriuria is the key threat for building up symptomatic urinary tract infection and is linked with considerable maternal and foetal perils. Therefore it can be recommended that every acute infection of the urinary tract throughout pregnancy necessitates instantaneous diagnosis and treatment. In untreated cases, the disease may go up and cause grim problems. Urine culture test should be customarily carried out for all antenatal women to reveal asymptomatic bacteriuria and each positive case must be treated appropriately to avert obstetric complications.

INTRODUCTION

Asymptomatic bacteriuria (ASB) or asymptomatic urinary infection, is isolation of a specified quantitative count of bacteria in an appropriately collected urine specimen obtained from a person without symptoms or

signs referable to urinary infection¹. Pregnant women are particularly vulnerable to urinary tract infection (UTI). Pregnant women with UTI may develop overt pyelonephritis or cystitis during pregnancy. Many women



may remain free of apparent infection throughout pregnancy and develop urinary sepsis during puerperium. Still others may have persistent bacteriuria but no overt symptoms of infection. Asymptomatic means simply exhibiting no symptoms while bacteriuria indicates the presence of bacteria in urine². The prevalence of bacteriuria in several different groups including healthy men and women, diabetic men and women, women with cystoceles, pregnant women and individual with chronic indwelling catheters has been reported³. Women are at increased risk of UTI due to several altered factors during pregnancy. The description of ASB includes the presence of actively multiplying bacteria somewhere within the urinary tract, excluding the distal urethra, at a time when patient has no urinary tract symptoms. Immediate diagnosis of asymptomatic bacteriuria by standard culture method helps in reducing further complications. In pregnancy UTI seems to be appear as isolated episodes and as it apparently respond to treatment therefore its progression grasped less consideration than warranted^{4,5}.

Patient characteristics also influence the microbiology of ABU. *Escherichia coli* is the most common organism and is the most likely to occur in healthy persons. A variety of organisms may be found, however, including Enterobacteriaceae, *Pseudomonas aeruginosa*, *Enterococcus* species and group B *Streptococcus*. As the name indicates, ASB does not cause symptoms and the condition simply refers to the detection of bacteria in a urine sample. Nonetheless, there is good reason to be concerned about this infection, particularly if woman is pregnant, because it can lead to a symptomatic upper urinary tract infection which can complicate pregnancy. The diagnosis of asymptomatic bacteriuria should be based on results of culture of a urine specimen collected in a manner that minimizes contamination. Because asymptomatic bacteriuria does not cause symptoms, it is important to know what increases the risk of infection. By being aware, one can help avoid the consequences of untreated asymptomatic bacteriuria by early detection and treatment. Researchers have identified a number of risk factors. The incidence of UTI varies depending on the local prevalence of ASB and whether it is treatable. Asymptomatic bacteriuria is common and the frequency varies among different populations, depending on factors such as age, sex and disorders⁶. Profound physiological and anatomical changes of the urinary tract during pregnancy contribute to the increased risk of ASB. It is a major risk factor for developing symptomatic urinary tract infections during pregnancy and may be associated with adverse effects on maternal and foetal health. The impact of ASB on pregnancy outcome has been a focus of controversy since the development of the quantitative urine-culture technique in the mid-1950s made it possible to differentiate women with bacteriuria from those without. These controversies centre on the fact that even though it is generally accepted that ASB is detrimental to pregnancy,

data available to support this contention are limited. Randomized controlled trials and cohort studies have shown that the detection and treatment of ASB can decrease the occurrence of acute pyelonephritis later in pregnancy and intrauterine growth restriction⁷. ASB is common in women and increases in prevalence with age and/or sexual activity⁸. Looking towards the importance of ASB in pregnancy complications, the present study was planned with the objective to find out the prevalence of ASB and to identify the most common causative agents among the isolated microorganisms.

MATERIALS AND METHODS

Present study was carried out on 150 pregnant women attending antenatal clinics at *Rajkiya Mahila Chikitsalaya*, Ajmer, Rajasthan, India during one year period. All consecutive asymptomatic patients attending antenatal clinics were between 20 – 24 weeks of gestation irrespective of age and parity. Patients who were in labour and those taking antibiotics while appearing for antenatal clinics were excluded from the study. Detailed history including complaints, obstetric history, menstrual history and past history were taken. General physical examination and obstetric examination were done. Ultrasonography was done to rule out incompetent os. Early morning mid stream clean catch urine samples were collected both for urine microscopy and urine culture.

Urine microscopy: First urine sample were collected and centrifuged. A drop of centrifuged urine was taken on a slide and covered with cover slip. Examination was done under 45 x (high power) by a light microscope. The whole of the slide was examined for presence of leucocytes. Those cases where the number of leucocytes was more than 5 per high power field were recorded.

Urine culture: All the urine samples were sent for culture to the Microbiology laboratory of J.L.N. Medical College, Ajmer, Rajasthan, India. Cultures were done on cystine lactose electrolyte deficient agar and read by a calibrated loop. Appropriate colony growth was read and quantitated. Growth on the media was sent for Gram stain as well as for biochemical tests. According to the urine microscopy and culture reports patients were categorized into group A and group B. Group A included those patients having positive urine microscopy and culture reports was labeled as study group. Group B included those patients having negative urine microscopy and culture reports was labeled as control group.

Follow up: The patient were followed throughout pregnancy till immediately after delivery. Regular obstetric examination was done at each visit and any abnormal antenatal finding was recorded in the original proforma. The patients were closely observed for any morbidity during the antenatal period like fever and urinary tract



infection during pregnancy. Those having positive findings were followed by complete microscopy of urine, culture and sensitivity.

Results

Present study was carried out on pregnant women between 20-24 weeks of gestational age attending antenatal clinics at *Rajkiya Mahila Chikitsalya*, Ajmer, Rajasthan, India during a period of one year. Women were subjected to complete urine examination and urine culture. According to urine microscopy and culture reports, they were categorized into study group (positive) and controls (negative). Out of 150 patients, 16 patients were found urine culture positive and 134 patients found urine culture negative. During follow up, 2 patients of study group and 4 patients of controls group left. Rest of the patients followed till delivery and perpeurium.

Relationship of urine and culture is presented in table 1. In study group, highest frequency of culture positive patients was observed in 23-27 years of age group. This group also showed highest frequency of culture negative patients of control group. In study group, lowest frequency of culture positive patients was observed in 33 years and above age group. This group also showed lowest frequency of culture negative patients of control group.

A comparison of pyuria and culture is presented in table 2. Out of total culture positive patients, 56.25%

patients had pyuria whereas in culture negative group only 3.73% had pyuria. Results clearly showed that pyuria as a screening test had a sensitivity of 56.25% and a specificity of 96.27%. Table 3 shows the distribution of bacteria in urine culture. E.Coli was present in majority (87.5%) of urine culture.

Relationship between parity and urine culture is presented in table 4. In the group of culture positive patients, 56.25% were primiparous whereas 43.75% were multiparous. In the group of culture negative patients, 49.25% were primiparous whereas 50.75% were multiparous. Pattern of results showed that there was no association between a positive culture urine and parity.

Prevalence of asymptomatic bacteriuria was 10.66% in present study. Incidence of asymptomatic bacteriuria was higher in 23-27 year of age group-43.75%. Prevalence of asymptomatic bacteriuria was marginally higher among primigravidas (56.25%). Pyuria as a screening test had sensitivity of 56.25% and specificity of 96.27%. It can be stated that urine microscopy alone is not a reliable screening test to diagnose asymptomatic bacteriuria. Urine culture can be considered as the gold standard test for diagnosing ASB. In the present study, E.Coli was the most common organism associated with asymptomatic bacteriuria. It was found in 87.5% of culture positive patients.

Table 1. Relationship of age and urine culture

Age group (In Years)	Urine culture (n=150)		Total
	+ve (Study group)	-ve (Control group)	
18-22	5 (31.25%)	31 (23.13%)	36 (24.00%)
23-27	7 (43.75%)	68 (50.75%)	75 (50.00%)
28-32	3 (18.75%)	30 (22.39%)	33 (22.00%)
33+	1 (6.25%)	5 (3.73%)	6 (4.00%)
Total	16 (100.00%)	134 (100.00%)	150 (100.00%)

Table 2. Comparison of pyuria and urine culture

Pyuria (WBC>5/HPF)	Urine culture (n=150)		Total
	+ve	-ve	
Present	9 (56.25%)	5 (3.73%)	14 (9.33%)
Absent	7 (43.75%)	129 (96.27%)	136 (90.66%)
Total	16 (100.00%)	134 (100.00%)	150 (100.00%)

Table 3. Distribution of bacteria in urine culture

Bacteria	Urine culture +ve patients (n=16)	%
E.Coli	14	87.5%
Proteus	1	6.25%
Klebsiella	1	6.25%
Enterococcus	0	-
Staphylococcus	0	-



Table 4. Relationship between parity and urine culture

Parity	Urine culture (n=150)		Total
	+ve	-ve	
Primiparous	9 (56.25%)	66 (49.25%)	75 (50.00%)
Multiparous	7 (43.75%)	68 (50.75%)	75 (50.00%)
Total	16 (100.00%)	134 (100.00%)	150 (100.00%)

DISCUSSION

In this study prevalence of asymptomatic bacteriuria during pregnancy was 10.66%. This is consistent with a reported frequency of around 10% found in earlier studies^{9,10,11}. It reflects the fact that prevalence in developing nation is higher than developed nations. In present study, highest incidence was observed in the 23-27 years age group. The incidence of bacteriuria increases with age probably because pelvic tissue gets lax with advancing age. It provides easier access of organisms to the urethra and then to bladder and upper urinary tract. Relationship of bacteriuria to age observed in the present study corroborated the earlier findings^{12,13}. Prevalence was marginally higher among primigravidas. This prevalence though not significant was consistent with the fact that in primigravida the pelvis being non yielding physiologically there are more chances of pressure on the ureters of these women. There are conflicting evidence in literature where both primi and multi has been cited as being commoner than the other^{14,15}.

In context of relative efficacy of the diagnostic tests the data observed included pyuria or WBC'S >5 /HPF with the characteristics in predicting a positive culture like sensitivity as 56.25%, specificity as 96.27%, positive predictive value as 64.29% and negative predictive value as 94.85%. Urine microscopy does not appear to be a reliable diagnostic approach. Its sensitivity was much less as compared to urine culture. This corroborated the earlier reports^{4,16}. In a study by Alfred *et al.*¹⁷ the prevalence of ASB was 13.8% by urine culture and 43.8% by urine microscopy among antenatal attendees with no relationship between ASB and age. They used urine culture as gold standard and found the sensitivity of urine microscopy as 90.9%, the specificity as 49.3%, the positive predictive value as 22.2% and the negative predictive value as 97.1%. Most studies utilized a single specimen as their basis for diagnosis. Upshot of the present study also found single void (clean catch) morning specimen to be appropriate for the diagnosis. However, Robertson *et al.*¹⁸ suggested the requirement of two consecutive specimens¹⁸.

Bacteria identified after urine culture in present study was E.Coli which was the most commonly grown bacteria on 87.5% cultures. Others included Proteus on

6.25% cultures and Klebsiella on 6.25% cultures. In a study conducted by Mc Millan *et al.*¹⁵, E.Coli was 58.3%, group B Streptococci as 11.1%, Proteus as 9.6%, Klebsiella as 8.3% and coagulase negative Staphylococci as 8.3% of total cultures. In another study, Robertson *et al.*¹⁸ found E.Coli 69%, Klebsiella 6.4%, Proteus 9.6%, Enterobacter 4.8%, group B Streptococci 4.8% and Enterococci 4.8%. Earlier workers have also found E.Coli as common microorganisms causing ASB in pregnant women among total isolates separated ranging from 65-80%¹⁹ to 80-90%²⁰ of positive cultures. Medical scientists are of the opinion that ASB in pregnancy, if left undiagnosed and not appropriately treated can lead to acute pyelonephritis in mothers and low birth weight in infants²¹. The relatively high prevalence of ASB during pregnancy, the significant consequences faced by women and their pregnancies and the ability to avoid undesired outcomes with treatment, justify screening and treatment of ASB in pregnancy²². It is suggested that all women attending antenatal clinics should be subjected to urine culture at 20-24 weeks of gestation, so that symptomatic bacteriuria can be detected well in time. Urine culture test should be customarily carried out for all antenatal women to reveal asymptomatic bacteriuria and each positive case must be treated appropriately to avert obstetric complications.

CONCLUSION

Urine culture can be considered as the gold standard test for the diagnosis of ASB. In the present study, E.Coli was the most common organism associated with asymptomatic bacteriuria. Asymptomatic bacteriuria is the key threat for building up symptomatic urinary tract infection and is linked with considerable maternal and foetal perils. The practice of screening pregnant women for ASB throughout the pregnancy should be adopted. It can be recommended that every acute infection of the urinary tract throughout pregnancy necessitates instantaneous diagnosis and treatment. In untreated cases, the disease may go up and cause grim problems.

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