Asymptomatic Bacteriuria in Pregnant Women

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ABSTRACT

Introduction: Asymptomatic bacteriuria is the significant presence of bacteria in urine of an individual without symptoms. The aim of the study is to determine the prevalence of asymptomatic bacteriuria in pregnant women.

Methods: This study was a prospective study conducted in the department of Obstetrics and Gynaecology at B. P. Koirala Institute of Health Sciences. The duration of the study was six months from January to June 2012. A total of 600 pregnant women were enrolled. All women were clinically identified to have no signs and symptoms of UTI. Clean catch midstream urine sample was collected from each patient into a sterile vial. The urine samples were examined for microscopic and culture sensitivity test.

Results: Out of 600 pregnant women, 52 were positive for significant bacteriuria with a prevalence rate of 8.7%. There was a significant difference in prevalence of asymptomatic bacteriuria with respect to trimester (P=0.005). Age did not show any significant difference in the prevalence of asymptomatic bacteriuria (P=0.807). There was not any significant difference in the prevalence of asymptomatic bacteriuria with respect to parity (P=0.864) and booking status (P=0.397). Escherichia coli (35%), Acinetobacter species (15%), Enterococcus species (12%) and Klebsiella pneumoniae (10%) were the common isolates. Most of the isolates were sensitive either to Nitrofurantoin, Norfloxacin or Amikacin.

Conclusions: Asymptomatic bacteriuria is common in pregnancy. Urine culture sensitivity should be carried out routinely on all pregnant patients in order to prevent the dangerous complications associated with it.

Keywords: *asymptomatic bacteriuria in pregnancy; urine culture and sensitivity.*

INTRODUCTION

Asymptomatic bacteriuria refers to persistent, actively multiplying bacteria within the urinary tract in women who have no symptoms suggestive of urinary tract infection. A clean voided specimen containing more than 10^5 organism/ml is diagnostic.[1] This is common during pregnancy but it occurs in non pregnant woman also. The physiological changes related to pregnancy make otherwise healthy women susceptible to serious infectious complications, arising from conditions such as asymptomatic and symptomatic urinary tract infections. The combination of mechanical, hormonal and physiological changes during pregnancy contributes to significant change in the urinary tract, which has a profound impact on the acquisition, and natural history

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of bacteriuria during pregnancy.[2] The physiological increase in plasma volume during pregnancy decreases urine concentration and up to 70% pregnant women develop glycosuria which encourages bacterial growth in the urine.[3,4]

The definition of asymptomatic bacteriuria is the presence of >100,000 colony forming units/ml of urine of a single pathogen in two consecutive midstream, clean catch urine specimen or one catheterization specimen from an individual without symptoms of urinary tract infection.[5-7] If asymptomatic bacteriuria is not treated, about 25% of the infected women subsequently develop acute symptomatic infection during that pregnancy.[1] Pregnancy enhances the progression from asymptomatic bacteriuria to symptomatic bacteriuria which could lead to pyelonephritis and adverse obstetric outcomes such as prematurity, low birth weight,8 and higher fetal mortality rates.[9,10]

Thus early detection and treatment can possibly decrease the occurence of adverse outcomes. The significant consequences of asymptomatic bacteriuria in pregnancy, plus the opportunity to avoid the sequelae with treatment justify screening pregnant women for bacteriuria. Urine culture is the gold standard for diagnosing asymptomatic bacteriuria. The American College of Obstetrics and Gynaecology (2002) recommend routine screening for bacteriuria with a urine culture at the first prenatal visit and during third trimester.[11] The US Preventive Services Task Force recommends screening for asymptomatic bacteriuria using urine culture for pregnant women at 12-16 weeks of gestation hoping to identify 80% of women, who will eventually develop asymptomatic bacteriuria.[12]

The aim of this study is to determine the prevalence of asymptomatic bacteriuria among pregnant women at their first hospital admission.

METHODS

This is a hospital based prospective study conducted in the department of Obstetrics and Gynaecology at B. P. Koirala Institute of Health Sciences (BPKIHS) during the period from January to June 2012. Ethical approval was obtained from the Institutional Ethical Review Board, BPKIHS. Informed consent was taken from the patient before the enrolment in the study. All pregnant women admitted in the ward for the first time at any period of gestation were assessed for inclusion and exclusion criteria. Pregnant women without any signs and symptoms of urinary tract infections were included. The exclusion criteria were patients with (1) with history of fever (>38°C), (2) any two of the following genitourinary complaints: dysuria, urinary hesitancy, urgency, slow stream, incontinence, frequency, incomplete voiding, flank/suprapubic/ hypogastric pain, (3) history of intake of antibiotics for any indication in previous two weeks during the current pregnancy, (4) known congenital anomaly of the urinary tract, (5) catheterization in previous two weeks, (6) known medical or renal disorder, (7) history of intake of immunosuppressive therapy at present, (8) active vaginal bleeding, (9) patient admitted in active stage of labour. Total of 600 pregnant women were enrolled. Every fifth patient who were meeting the inclusion criteria and also who agreed to participate in the study were included.

Baseline data like maternal age, gravida, parity, and period of gestation were included. Detail history was taken with emphasis on previous history of urinary tract infection, previous antibiotic intake, previous prenatal check up, personal history of diabetes and presence of genitourinary tract signs and symptoms.

Urine was sent for routine microscopy examination and culture sensitivity for each patient. Mid-stream clean catch urine sample was obtained from each consenting patient in sterile vial after proper verbal instructions. Each urine sample was subjected to direct microscopy and bacterial culture. Centrifuged urine was assessed microscopically for the presence of pus cells, red blood cells, casts, crystals, and bacteria. Aerobic bacterial culture was performed using the "Standard loop" semi-quantitative method to diagnose significant bacteriuria. Briefly, one loop full was taken in the standard loop holding 0.001 ml of urine and was inoculated into each of Mac-Conkey and CLED (Cystine Lysine Electrolyte Deficient) medium. The plates were incubated aerobically over night at 37 0C. A count of ≥105 CFU/ml was taken as significant bacteriuria and was processed further for identification of bacteria. Repeat culture was requested for patients with contaminant result. Antibiotic sensitivity for commonly prescribed antibiotics (ampicillin 10 mcg, ciprofloxacin 5 mcg, cefotaxime 30 mcg, gentamicin 10 mcg, norfloxacin 10 mcg, nitrofurantoin 300 mcg, nalidixicacid 30 mcg, cotrimoxazole 25/23.75 mcg, amikacin 30 mcg, ceftazidime 30 mcg, tobramycin 110 mcg, piperacillin 100 mcg and carbenicillin 100 mcg) was performed using the Kirby-Bauer's disc diffusion technique. The results were interpreted as per the Clinical and Laboratory Standard Institute (CLSI) guidelines.[13]

The patients having positive urine culture report were treated with appropriate antibiotics.

Statistical analysis was done with SPSS program version 11.5 using chi-square and t-test.

RESULTS

Total of 600 pregnant women were screened for bacteriuria. Out of 600, 52 had significant bacteriuria with prevalence rate of 8.7%. Urine culture sensitivity report was contaminant for 20 pregnant women for the first time and repeat urine culture was sent which was sterile for all those patients.

The mean age was 24.47 years with standard deviation of 4.593. Age ranged from 17-40 years. The mean period of gestation was 33.65 weeks with standard deviation of 9.734. Minimum period of gestation was five weeks and maximum was 43 weeks. Out of 600 pregnant women, 351 (58.5%) were primigravida and 249 (41.5%) were multigravida. Two hundred and five (34.2%) were booked and 395(65.8%) were unbooked. Routine and microscopic examination revealed that 538 women had <5 pus cells compared to 62 with >5 pus cells.

The distribution of age was similar between bacteriuric and non bacteriuric group as shown in (Table 1).

Table 1. Relation of urine culture sensitivity with maternal age.

Urine culture/ sensitivity	Number of pregnant women	Mean age (years)	Standard deviation	P value
Positive	52	24.62	±4.815	0.807
Negative	548	24.45	±4.576	0.807

Positive urine culture sensitivity was seen in women with less period of gestation (p=0.005) as shown in Table (2).

Table 2. Relation of period of gestation with urine culture sensitivity.

Urine culture/ sensitivity	Number of pregnant women	Mean Period of gestation (weeks)	Standard deviation	P value
Positive	52	29.27	±11.471	0.005
Negative	548	34.07	±9.460	0.005

There was no significant difference in prevalence of asymptomatic bacteriuria with respect to parity (P=0.864) and booking status of the pregnant women (P=0.397). The number of pus cells in urine had no significant difference in prevalence of asymptomatic bacteriuria (P=0.084).

Escherichia coli (35%), Acinetobacter species (15%), Enterococcus species (12%) and Klebsiella pneumoniae (10%) were the common isolates. Fifty percent of the isolates were sensitive to Nitrofurantoin followed by Norfloxacin (25%) and then Amikacin (15%).

DISCUSSION

The prevalence of asymptomatic bacteriuria in pregnant women in this study was 8.7%. This is lower than the prevalence found in the study by Amadi ES et al. in Abakaliki, Nigeria.[14] They found the prevalence to be 78.7%. Prevalence of asymptomatic bacteriuria in pregnant women was 45.3% in the study by Imade PE et al which was higher than this study.[15] Akerele et al reported a prevalence of 86.6% asymptomatic bacteriuria among pregnant women in Benin City, Nigeria.[16] Sescon NI et al. found the prevalence to be 4.3% among Filipino pregnant women in Philippine General hospital.[17] Some other studies like Turpin CA et al found the prevalence of asymptomatic bacteriuria to be 7.3% which was less than the present study.[18] Similarly, Gayathree L et al. found the prevalence of asymptomatic bacteriuria to be 6.2% which was also less than this study.[19]

There was no significant difference in the prevalence of asymptomatic bacteriuria with respect to age (p=0.807) in this study. This may be because the distribution of age between the bacteriuric and non bacteriuric groups was the same. But the study by Imade PE et al concluded that there was significant difference in prevalence of asymptomatic bacteriuria with respect to age group (P<0.0001).[15] Shirazi et al. divided the pregnant women into three groups on the basis of their age and found that the prevalence rate had decreased with increase in age. So the prevalence was 13.8% in age group less than 21 years compared to 3% in age group over 30 years, but there was no significant difference between the different age groups.[20] Sescon NI et al states that age has no detectable influence on the frequency of bacteriuria.[17] Similarly, insignificant difference was observed in maternal age of bacteriuric and non bacteriuric pregnant women by Gulfareen Haider et al.[21]

There was significant difference in the prevalence of asymptomatic bacteriuria with respect to the period of gestation in this study. Positive urine culture sensitivity was with pregnant women with less period of gestation (P=0.005). Imade et al. did not find any significant difference in the prevalence of asymptomatic bacteriuria with respect to trimester (P=0.2006).[15] Gayathree L et al found to have higher prevalence of asymptomatic bacteriuria in the third trimester as compared to second and first trimester.[19] Pregnant women in their third trimester had the highest prevalence of asymptomatic bacteriuria (36%), followed by second trimester

(33.1%) and least in first trimester (30.5%) as revealed by Amadi ES et al.[14] Gulfareen Haider et al. found that the frequency of bacteriuria at different period of gestation revealed no statistically significant result ($p = 0.14$).[21]

Turpin CA et al revealed no significant difference in prevalence of asymptomatic bacteriuria with increasing parity as in this study.[17] Shirazi et al. while evaluating asymptomatic bacteriuria in relation to the number of fertility found that the incidence of asymptomatic bacteriuria in patients with one time fertility was 11.5%, while the least rate with 7.3% has been observed in patients with more numbers of fertility, but this difference was not significant.

Escherichia coli was the most common organism responsible for asymptomatic bacteriuria in all the studies.

CONCLUSIONS

Asymptomatic bacteriuria may lead to adverse obstetric outcomes. Thus, it is important to detect as well as treat asymptomatic bacteriuria in pregnancy.

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