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Research Article

Asymptomatic bacteriuria among pregnant women

Sudha Biradar Kerure^{1*}, Rajeshwari Surpur², Sheela S. Sagarad³, Sneha Hegadi⁴

¹Associate Professor in OB/GYN, Navodaya Medical College, Raichur, Karnataka, India

²Associate Professor in Microbiology, Navodaya Medical College, Raichur, Karnataka, India

³Senior Consultant in Obstetrics & Gynecology, Raichur, Karnataka, India

⁴PG in Microbiology, Navodaya Medical College, Raichur, Karnataka, India

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***Correspondence:**

Dr. Sudha Biradar Kerure,

E-mail: dr_sudhabiradar@rediffmail.com

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ABSTRACT

Background: Urinary tract infections (UTIs) are the most common bacterial infections during pregnancy. Asymptomatic bacteriuria (ASB) is a major risk factor for the development of urinary tract infections during pregnancy and with further risk of preterm birth & pyelonephritis if untreated.

Aims & Objectives: This study was carried out to determine the prevalence of asymptomatic bacteriuria (ASB) in pregnant women & to isolate, identify and establish antimicrobial susceptibility of pathogens.

Methods: A total of 500 pregnant women were studied over a period of one year. Clean catch midstream urine sample was collected into a sterile container & then subjected to culture method.

Results: Significant bacteriuria was noted in 45 patients (9%). 3% patients had insignificant bacteriuria. Growth of contaminants was noted in 8%. 80% samples were sterile with no growth. *E. coli* was the most common etiological agent, followed by *Staphylococcus aureus*.

Conclusions: Asymptomatic bacteriuria is not uncommon in antenatal patients. All pregnant women should be screened by urine culture to detect asymptomatic bacteriuria at their first visit to prevent overt UTI & other complications in both mother & fetus.

Keywords: Asymptomatic bacteriuria, UTI, Pregnant women, Urine culture

INTRODUCTION

Asymptomatic bacteriuria is common in women and increases in prevalence with age and/or sexual activity, due to short urethra, pregnancy, easy contamination of urinary tract with fecal flora.¹⁻³ Asymptomatic bacteriuria (ASB) is defined as persistently & actively multiplying bacteria in significant numbers i.e., 10^5 bacteria per millilitre (ml) within the urinary tract without any obvious symptoms.⁴ The pregnant women are two times more commonly affected than age matched non pregnant females.^{5,6} This is due to urinary stasis due to progesterone effect in pregnancy in addition to different morphological & physiological changes occurring during pregnancy.

Asymptomatic bacteriuria is found in 2-10% of pregnant women.³ Detection of ASB in antenatal women is important, as, undetected and untreated ASB may lead to symptomatic infection during that pregnancy in 25% of culture positive patients, acute pyelonephritis, hypertension in pregnant women, postpartum UTI, anaemia, preterm labour, low birth weight & perinatal death of the fetus.^{2,4}

Urine culture is the gold standard screening technique for ASB during pregnancy.⁷⁻⁹ The most common infecting organism is *Escherichia Coli*, which is responsible for 75-90% of bacteriuria during pregnancy. 25-30% of the asymptomatic bacteriuria cases develop into acute symptomatic UTI. Hence, early detection and treatment is

of considerable importance not only to prevent acute pyelonephritis & chronic renal failure in the mother, but also to reduce prematurity & fetal mortality.^{1,7}

METHODS

This prospective study was undertaken in 500 antenatal women, irrespective of their period of pregnancy, attending Obstetrics & Gynecology OPD and those admitted in wards at Navodaya Medical College Hospital, Raichur, Karnataka over a period of one year from January 2012 to December 2012. Urine culture was performed in Microbiology laboratory. The study & data collection were carried out with the approval from the Institutional Ethical Committee.

Exclusion criteria:

- 1) Symptoms suggestive of infections in urinary tract (dysuria, frequency & urgency)
- 2) History of antibiotic therapy in previous two weeks
- 3) History of fever
- 4) Pregnancy induced hypertension
- 5) Pregnancy with Diabetes Mellitus; &
- 6) Known congenital anomalies of urinary tract

Informed consent was taken & antenatal women were counselled regarding the collection of "clean catch" mid stream urine sample in a sterile, wide mouthed container that can be covered with a tightly fitted lid. Microscopic examination of a wet film of uncentrifuged urine was carried out to detect the presence of the pus cells, erythrocytes, micro-organisms, casts etc. The urine samples were processed within 1-2hrs of collection, using standard microbiological procedures. The culture was done on 5% sheep blood agar and Mac-Conkey agar by standard loop method and incubated at 37°C for 24hours. Prolonged incubation was done for further 24hrs if no growth obtained. The identification of organisms was done by Gram staining, motility test, catalase test, oxidase test, coagulase test, and routine biochemical tests as per Cowan and Steels Manual.⁹ The growth was interpreted as sterile if no growth obtained. It was interpreted as Significant if the number of colonies corresponded to 10⁵ colony forming units (CFU) per ml. Insignificant growth was reported if colony count was less than 10⁵ CFUs per ml.

The standardized Kirby-Bauer disc diffusion method on Muller Hinton agar plate as per recommendations of NCCLS (CLSI) was used for antibiotic sensitivity testing.¹⁰ The antibiotics tested were Ciprofloxacin, Norfloxacin, Erythromycin, Ampicillin, Amoxicillin-Clavulanic acid, Amikacin, Sparfloxacin, Co-trimoxazole, Cefotaxime, Ceftazidime, Nitrofurantoin, Piperacillin, Tazobactam, Imipenem, Tobramycin, Cefepime, and Cefoperazone-Sulbactam. All the asymptomatic bacteriuric pregnant women were advised to take treatment.

RESULTS

Out of 500 pregnant women examined for asymptomatic bacteriuria, 400 samples were sterile with no growth. Significant bacteriuria was found in 45(9%) cases and insignificant bacteriuria in 15(3%) cases. Growth of contaminants was seen in 40(8%) samples (Table 1).

Table 1: Results of culture.

Results of culture	No. of cases	%
Significant bacteriuria	45	9
Insignificant bacteriuria	15	3
Contamination	40	8
Sterile	400	80
Total	500	100

Table 2: Age distribution of culture positive cases.

Age (years)	No. of culture Positive cases	%
18-25	13	28
26-35	23	52
>36	09	20
Total	45	100

The highest number of culture positive cases among pregnant women were in the age group of 26-35 years (52%), followed next by 18-25 years (28%) & >36years (20%). The youngest among the cases studied was 18 years old & the oldest was 39 years old (Table 2).

Significant bacteriuria was found more in primigravida (56%) than multigravida (44%).

In our study, maximum number of culture positive cases were noted in second trimester (44.4%), followed next by first trimester (28.8%) and third trimester (26.6%) (Table 3).

Table 3: Trimester wise distribution of culture positive cases.

Trimester	No. of culture positive cases	%
First	13	28.8
Second	20	44.4
Third	12	26.6
Total	45	100

The commonest isolated organism was E. coli in 35 patients (77.77%), followed by S. aureus in 5 patients (11.11%), Klebsiella pneumonia in 3 cases (6.66%), Acinetobacter & Citrobacter each in one case (2.22%) of culture positive cases (Table 4).

In our study, three organisms (6.66%) were found to be resistant to first line antimicrobial drugs like Ampicillin, Co-trimoxazole, Norfloxacin, Cefoperazone &

Nitrofurantoin. Out of three isolates, one each were *E. coli*, *K. pneumoniae* & *S. aureus*. The three isolates were found to be sensitive to second line drugs. *K. pneumoniae* was sensitive to Amikacin, *E. coli* was sensitive to Cefuroxime & Ceftazidime, and *S. aureus* was sensitive to Amoxicillin-Clavulanic acid.

Table 4: Distribution of culture positive cases according to bacterial isolates.

Name of Isolate	No. of cases	%
<i>E. coli</i>	35	77.77
<i>S. aureus</i>	05	11.11
<i>Klebsiella pneumonia</i>	03	6.66
<i>Citrobacter</i>	01	2.22
<i>Acinetobacter</i>	01	2.22
Total	45	100

DISCUSSION

Urinary tract infections are common in females & that too in pregnancy. Asymptomatic bacteriuria of pregnancy needs special attention, due to lack of symptoms & its adverse consequences in pregnancy. A cost evaluation study reported that screening for pyelonephritis is appropriate when the prevalence of ASB is greater than 2%.¹¹ In our study, we found the prevalence of ASB to be 9% and so, screening all antenatal women for ASB, especially in early pregnancy by a quantitative urine culture is recommended.

Overall, the incidence in various Indian studies was found to be between 5 & 12%, and in Western studies, the incidence ranges from 2-7%.¹² In the present study, significant bacteriuria was found in 9% cases, which was almost similar to other studies.^{3,7,13} This may be due to stasis produced by gravid uterus, and since most *E. coli* strains prefer that environment, they cause UTI. Another reason could be as a result of poor genital hygiene practices by pregnant women who may find it difficult to clean their anus properly after defecating or clean their genitals after passing urine.^{1,13}

Antenatal women in age group 26-35 years had highest percentage of culture positive cases (52%), followed by 18-25 years age (28%) & >36 years age (20%) respectively (Table 2). Similar age pattern was also observed in other studies.¹³⁻¹⁵ The reason may be due to that, women between 26-35 years age group may be multiparous, and multiparity is a risk factor for acquiring asymptomatic bacteriuria in pregnancy.^{13,16,17}

In our study, most culture positive cases were seen in second trimester (44.4%), which was similar to Girishbabu R J study¹ and Nath et al study⁵.

The gram negative bacteria were mainly responsible for asymptomatic bacteriuria. *E. coli* was commonly found in 35 cases (77.77%) in our study which is similar to

different studies, where also *E. coli* was found to be the commonest isolate.^{6,18-20}

The isolates were most sensitive to nitrofurantoin and imipenem, followed by ceftazidime, amikacin, cefotaxime, co-trimoxazole, amoxicillin-clavulanic acid & erythromycin.

Incidence of low birth weight babies (50%) and prematurity (75%) was higher in untreated asymptomatic bacteriuric patients in a study by Lavanya S V et al¹⁸ and Nath et al⁵.

P. Mitra et al²¹ found pre-eclamptic toxemia was more common in the bacteriuric group (9.1%) as compared to abacteriuric group (6%).

All patients with significant bacteriuria were advised to take appropriate antibiotics as per the sensitivity report.

CONCLUSION

Significant bacteriuria was present in 9% in this study. The most sensitive test for its detection is urine culture with clean-catch mid stream urine. Women with ASB may have serious consequences on both mother & child. Therefore, it is important to screen all antenatal women for asymptomatic bacteriuria at their first prenatal visit, preferably in first trimester, and those who are positive should be followed up closely after treatment because about 1/3rd will experience a recurrence.

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