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Research Article

Prevalence of asymptomatic bacteriuria in antenatal women attending a tertiary care hospital

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ABSTRACT

Background: Asymptomatic bacteriuria is the presence of actively multiplying bacteria within the urinary tract in the absence of any symptoms. Antenatal women are more susceptible to urinary tract infection because of the anatomical and physiological changes which occur during pregnancy. Aim of current study was the aim of this study was to determine the prevalence of asymptomatic bacteriuria in pregnant women, the organisms responsible and to treat the same.
Methods: A total of 174 antenatal women of ≤28 weeks of gestation who had no clinical features of urinary tract infection were recruited for this study over a period of 6 months. Midstream urine sample was collected and sent for routine examination and culture-sensitivity testing.
Results: Significant bacteriuria was detected in 22 (12.6%) antenatal women. Of them 13 (59.1%) belonged to the age group 26-30 years. Nearly half of the culture positive cases, that is 10 (45.5%) were educated upto primary school and they belonged to socioeconomic status class 4. Majorities (68%) were in the second trimester of pregnancy and the commonest organism isolated was *E. coli*.
Conclusions: Undetected and untreated asymptomatic bacteriuria leads to chronic drug resistant infection, hypertension, anemia, etc. in the mother and prematurity, intrauterine growth restriction etc. in the fetus. Hence it is important to do urine culture for all women during antenatal check-up.

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

INTRODUCTION

Urinary Tract Infection (UTI) is common in women because of their short urethra and its close proximity to anus and vagina.[1,2] It occurs more frequently in pregnancy due to reduced immunity, renal glycosuria and urinary stasis due to smooth muscle relaxation effect of progesterone.[3,4]

Routinely during antenatal checkup, urine is checked for the presence of protein and sugar, microscopy for RBCs, pus cells, casts etc. A culture should also be done to detect bacteriuria. Prevalence of Asymptomatic Bacteriuria (ASB) in developing countries is 5-12%, while in the West it is 2-7%.[2] It refers to presence of persistent, actively multiplying bacteria within the urinary tract in the absence of clinical features of UTI. A clean voided specimen containing $\geq 10^5$ organisms per ml is considered as significant bacteriuria.[5] Urine culture is the gold standard for detecting it.[6-8] It is a useful screening test when done between 12-16 weeks of gestation. Commonest organisms responsible are

Escherichia coli (80-85%), followed by *Staphylococci*, *Klebsiella*, *Pseudomonas* etc. It is associated with adverse maternal and perinatal outcome.

Adverse maternal outcomes include symptomatic infection in 25% of infected women, chronic infection resistant to drugs, acute pyelonephritis, pre-eclampsia, anemia, chorioamnionitis, endometritis and UTI in the postpartum period.[1,2,5,9-11] Fetal complications include prematurity, IUGR, low birth weight and increase in perinatal mortality.[1,2,5,11-15] These complications can be prevented by timely detection and treatment.[16] Hence it becomes necessary to screen all antenatal women for the presence of ASB. This study was conducted to highlight its importance.

METHODS

This was a cross sectional study conducted over a period of 6 months in 174 antenatal women attending our OP. This study was done with the approval of the institutional ethical committee. Informed consent was taken. A brief history was obtained. Their period of gestation was ≤28 wks. They had no clinical features suggestive of UTI or genital tract infections. Women who had symptoms and signs of UTI, were on antibiotics or had taken antibiotics over the past 14 days or had medical or renal diseases were excluded from the study.

They were instructed to collect clean catch mid-stream urine sample in the sterile container provided. The samples were sent to the microbiology lab immediately and processed within 1-2 hours. Wet mount of the deposit obtained after centrifuging urine was viewed under high power for pus cells, RBCs, casts and micro-organisms. A further sample was cultured on CLED medium by standard loop method and incubated at 37°C for 24 hours.

Organisms were identified by gram staining, catalase test, coagulase test and routine biochemical tests as per Cowan and Steels manual.[8] If there was no growth, it was reported as sterile, if there was growth and the number of colonies corresponded to 10^5 colony forming units (CFU) per ml or more, it was considered significant. Insignificant growth was reported if it was less than 10^5 CFUs per ml. The antibiotic sensitivity testing was done by Kirby Bauer disc diffusion method on Muller Hinton agar plate as per recommendation of NCCLS (CLSI).[17] All women whose urine culture was positive were then treated according to their drug sensitivity. After 2wks of completion of antibiotic course, another urine sample was sent for culture to detect effectiveness of treatment and for detecting recurrence. Data obtained were analyzed using Statistical Package for Social Sciences (SPSS) software.

RESULTS

Of the 174 urine samples tested, 108 were sterile, 32 (18.4%) showed contaminants, significant bacteriuria was reported in 22 (12.6%) samples and insignificant growth in 12 (6.9%) (Table 1).

Table 1: Urine culture results.

Culture	No. of cases	Percentage
Significant bacteriuria	22	12.6
Insignificant bacteriuria	12	6.9
Contamination	32	18.4
Sterile	108	62.1
Total	174	100

Of the 22 cases who had significant growth, 13 (59.1%) were in the age group of 26-30 years, 6 (27.2%) were between 21-25 years, 2 (9.1%) were between 16-20 years and 1 (4.6%) between 31-35 years (Table 2).

Table 2: Prevalence of culture positive cases according to age.

Age (years)	Culture positive cases	Percentage
16-20	2	9.1
21-25	6	27.2
26-30	13	59.1
31-35	1	4.6
Total	22	100

Majority of them were educated upto primary school, that is 10 (45.5%) of the 22 culture positive cases. Five (22.7%) of them were illiterate, another 5 (22.7%) had high school education and 2 of them were degree holders (Table 3).

Table 3: Literacy status.

Educational qualification	Culture positive cases	Percentage
Illiterate	5	22.7
Primary school	10	45.5
High school	5	22.7
Degree holder	2	9.1
Total	22	100

According to modified B. G. Prasad's socioeconomic status classification based on per capita income, 10 (45.5%) belonged to class four, 7 (31.8%) to class five and 4 (18.2) to class three (Table 4).

In this study 15 (68%) antenatal women who had significant bacteriuria belonged to second trimester and 7 (32%) were in first trimester (Table 5).

The most common organism isolated was *E. coli* in 14 (63.63%) antenatal women, followed by *K. pneumoniae*

in 4 (18.18%), *S. aureus* in 3 (13.64%) and *Streptococcus* in 1 (4.55%) of them (Table 6).

Table 4: Socioeconomic status.

Class	Per capita income (Rs.)	Culture positive cases	Percentage
1	≥5156	0	0
2	2578 - 5155	1	4.5
3	1547 - 2577	4	18.2
4	773 - 1546	10	45.5
5	<773	7	31.8

Table 5: Prevalence according to trimester of pregnancy.

Trimester	Culture positive cases	Percentage
First	7	32
Second	15	68
Total	22	100

Table 6: Bacterial isolates detected.

Organisms	Culture positive cases	Percentage
E. coli	14	63.63
Klebsiella	4	18.18
Staph aureus	3	13.64
Streptococcus	1	4.55
Total	22	100

All organisms were found to be sensitive to the following commonly used antibiotics: amoxicillin, amikacin, gentamicin, cefotaxime, nitrofurantoin, amoxicillin-clavulanic acid, cefuroxime.

DISCUSSION

Diagnosing and treating asymptomatic bacteriuria in pregnant women is essential in order to avoid major complications to the mother and baby. Investigating by doing urine culture and sensitivity during antenatal check-up is gold standard and cost-effective method.

In our study the prevalence of ASB was 12.6%. This is similar to the prevalence rate as reported by Senthinath et al.[18] Various other Indian studies have shown a prevalence rate between 5 and 12%.[6,12,19-21] In developed countries the prevalence was between 2-7%.[22]

There was no significant difference in the prevalence of ASB with respect to age (P = 0.564) in this study. The age group of 26-30 years had maximum number of cases (59.1%). This has been observed in previous studies also.[23-27] This can be explained because of multiparity amongst them which is a risk factor for ASB. But Lavanya et al[12] reported higher incidence in those below 25 years and in primis.

Culture positive cases were more in women educated upto primary school (45.5%), with equal number belonging to illiterate and high school educated group (22.7%). There was a significant association between prevalence of ASB and education (P=0.044). The observation made in our study differs from that of Oli et al[28] who recorded a higher prevalence among illiterate women (27.5-90%).

Comparing socioeconomic status, 45.5% of the positive cases belonged to class 4 and 31.8% to class 5 of the modified B. G. Prasad's socioeconomic status classification.[29] There is a higher percentage of cases among women of lower socioeconomic status. This may be due to poor hygiene and lack of basic amenities. Similar trend was noted in the study by Lavanya et al,[12] while Perera J et al[30] found no significant association between them.

More than half the cases (68%) were in the second trimester. This was not statistically significant (P=0.297). But this concurs with the observations made in the previous studies.[3,20,31]

The commonest bacterial isolate was *E. coli* (63.63%) followed by *K. pneumoniae* (18.18%) and *Staphylococcus aureus* (13.64%). The same trend has been reported in earlier studies.[4,12,15,18,20,23,29,32] These organisms were found to be sensitive to most of the first line drugs mentioned. Resistance was noted to norfloxacin, cefoxitin, ampicillin, nalidixic acid and co-trimoxazole. The patients were then prescribed the appropriate antibiotics as per the sensitivity report. Since one-third of the patients developed recurrence, another urine culture test was done 2 weeks after completion of antibiotic course to check response to therapy and detect recurrence.

CONCLUSION

Screening of pregnant women is reported to be cost effective if the prevalence rate of ASB is ≥2%.[33] Hence by this study we wish to highlight the importance of including urine culture as a part of routine antenatal check-up in order to avoid dire complications. Besides this health education on personal hygiene should be imparted in the antenatal clinic.

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