

Prevalence and outcome of asymptomatic bacteriuria in pregnant women

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Abstract

Background and objectives: Aim of our study is to determine the prevalence of asymptomatic bacteriuria (ASB), common pathogens involved, the antibiotic susceptibility patterns and to determine the outcome in patients with significant bacteriuria. This cross-sectional study was carried out at Al Ameen Medical College, Bijapur from November 2013 – October 2015. **Methods:** Over a two years period urine samples were collected from 300 pregnant women aged between 18-37 years with varying gestational periods attending the antenatal clinic on their first visit. A clean catch mid stream urine specimens were collected in a sterile container and processed within half an hour. Screening tests - Gram staining of uncentrifuged urine, pus cell count, nitrite test and leukocyte esterase test were done. Culture of urine samples were done by a semiquantitative method, standard loop technique on Blood agar and Mac Conkey agar and incubated at 37°C for 24 hours. Significant bacteriuria with > 10⁵CFU/ml of urine was confirmed by colony count. Organisms were identified and antibiotic sensitivity test performed. **Result:** Out of 300 pregnant women included in our study, 25 (8.4%) patients were identified by culture to have significant bacteriuria. Maximum numbers of patients belong to the age group 22-25 years and highest percentage of significant bacteriuria (60%) was identified in the same age group. High percentage of asymptomatic bacteriuria seen in 3rd (56%) trimester and in multigravidas (44% in gravid 2). Significant bacteriuria was high among the lower socio-economic group (92%). *E. coli* (52%) was the most common organism followed by *K. pneumoniae* (20%). Prevalence of Gram-negative organism was 84%. The drug sensitivity revealed that 88.5% of isolates were sensitive to amikacin followed by TMP-SFX (80.8%). Among 25 patients with ASB, two had (8%) moderate anemia, one had (4%) severe pre-eclampsia at term, and one had (4%) preterm labor. Two (8%) patients had recurrent infection. **Conclusion:** This study conducted to identify the common pathogens causing ASB in pregnant women with antibiotic sensitivity so that early treatment can be started and deadly complications can be prevented. Resistance was encountered to the common drugs used in treatment posing problems in treating the patients, hence urine culture and sensitivity is gold standard approach in treating ASB.

Keywords: Asymptomatic bacteriuria; Pregnancy; Outcome; Prevalence.

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INTRODUCTION

Asymptomatic bacteriuria is defined as the presence of more than 100,000 colonies of a single bacterial species per milliliter of urine, cultured from midstream sample in the absence of declared symptoms.¹ It is also known as Covert bacteriuria. Asymptomatic bacteriuria is common

in women and increases in prevalence with age and/or sexual activity. The prevalence of asymptomatic bacteriuria in pregnancy varies from 4-7% (range 2-11%) and is similar to that observed in non-pregnant women.² Although pregnancy does not predispose a woman to the acquisition of bacteriuria in the bladder (i.e., asymptomatic bacteriuria), it does predispose her to acute upper urinary tract infection or pyelonephritis.³ Pyelonephritis develops in 20-40% of pregnant women with untreated asymptomatic bacteriuria. Approximately, 40-80% of pregnancy complications caused by acute pyelonephritis could be prevented by treating asymptomatic bacteriuria. It has been clearly established that untreated bacteriuria can have serious implications for both mother and fetus. It is implicated as a risk factor for adverse perinatal outcomes like premature birth, low birth weight and perinatal death. In addition, association has been documented between antepartum UTI and a

variety of maternal complications of pregnancy including hypertension, pre-eclampsia, anaemia, amnionitis and endometritis. Screening for asymptomatic bacteriuria is a standard of obstetrical care and is included in most antenatal guidelines. Asymptomatic bacteriuria is a microbial diagnosis which is based on the isolation of a specified quantitative count of bacteria in a specimen of urine which is properly collected from a pregnant woman who does not have any signs or symptoms. Thus, the gold standard test for bacteriuria is the quantitative culture of urine.⁶

MATERIALS AND METHODS

Source of data

Asymptomatic antenatal cases visiting the antenatal OPD clinic of Al Ameen medical college, Bijapur.

Duration of study

This study was conducted on samples collected during a period of two years from November 2013 to October 2015.

Type of study

This is a cross-sectional study where in subjects were selected on a purposive sampling basis. 306 pregnant women aged between 18-37 years were chosen as study subjects. 6 samples were rejected as contaminants.

Place of study

This study was conducted at Department of obstetrics and gynecology, Al Ameen Medical College Hospital, Bangalore.

Inclusion criteria

- All pregnant women without symptoms of urinary tract infection.
- Pregnant women without antibiotic treatment (for any cause).

Exclusion criteria

- All pregnant women with symptoms of urinary tract infection.
- Pregnant women on antibiotic treatment.
- Pregnant women with pre-existing renal anomalies and renal calculi.

Ethical consideration

Urine samples were collected after obtaining the consent from them. The patients then selected were studied as per the proforma formulated. A detailed history was taken with regard to age, marital status, educational qualification, occupation, religion, personal hygiene, period of gestation and parity. Past history of UTI, tuberculosis, hypertension and diabetes mellitus if any, were recorded.

Laboratory diagnosis

A clean catch about 20 ml was collected in a sterile universal container. For the proper collection of mid stream urine and to avoid contamination every patient was instructed to clean the per urethral area and perineum with two or three gauze pads Saturated with soapy water, using forward to back motion followed by a rinse with sterile saline or water. With labia held apart midstream urine was collected in a sterile container. Samples thus collected were transported to the Microbiology laboratory within one hour. In case of delay, the sample was refrigerated at 4 degree C for as long as 24 hours.⁴¹ The urine samples were observed macroscopically for its color, turbidity and deposits and the findings were recorded and then subjected to various tests as follows:

1. Gram stain of uncentrifuged urine.
2. Pus cell count of the uncentrifuged urine.
3. Nitrate reductase (Griess) Test.
4. Leucocyte esterase test
5. Urine culture.

RESULTS

Out of the 300 pregnant women screened in this study 25 (8.4%) patients were identified by culture to have significant bacteriuria.

Age distribution of patients

Table 1: Age distribution of patients

Group	Age in years	No of cases	Percentage %	Significant bacteriuria	Percentage %
I	18-21	96	32.0	8	32.0
II	22-25	118	39.3	15	60.0
III	26-29	58	19.3	2	8.00
IV	30-33	23	7.7	0	0
V	34-37	5	1.7	0	0
Total		300	100.0	25	100.0

Table 1 shows that maximum number of patients belongs to the age group of II (22-25 years) i.e., 118 patients and highest percentage of significant bacteriuria 60.0% was identified in the same age group. Lowest percentage of positive cases was seen in patients over 26 years.

Distribution of patients according to parity

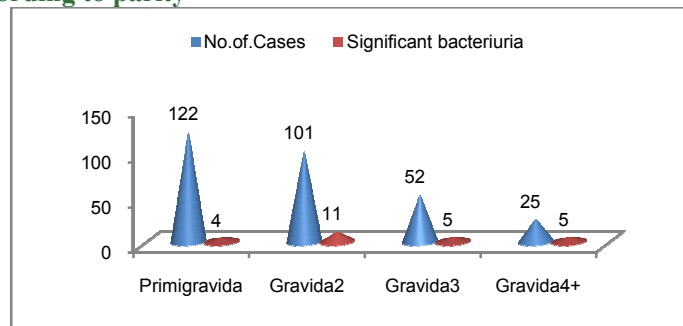


Figure 1: Distribution of patients according to parity

Highest number of ASB patients was seen in Gravida 2 11 (44.0%), followed by gravida-3 and gravida 4+ each had patients 5 (20.0%). Lowest number cases of ASB seen in primigravidas who constituted 4 patients (16.0%) in this study.

Organism causing asymptomatic bacteriuria

E. coli was the predominant organism isolated 52.0%, followed by other such as Klebsiella (20.0%), S.aureus (12.0%) and only (4%) patients had pseudomonas aeruginosa, 4% had Enterobacter and 4% had Enterococci.

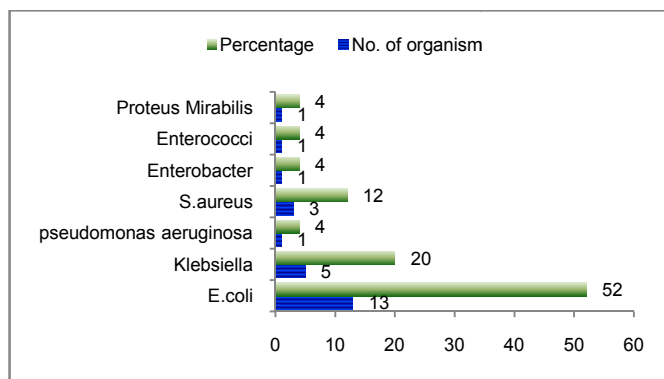


Figure 2: Organism causing asymptomatic bacteriuria

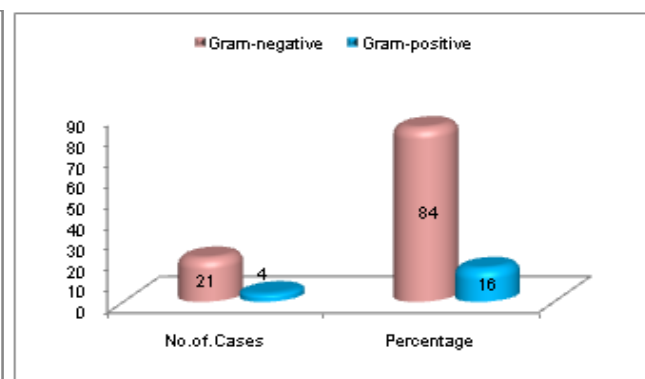


Figure 3: Prevalence of Gram-positive and Gram-negative isolates

Prevalence of Gram-positive and Gram-negative isolates

This figure 3 shows the distribution of Gram-negative organism to be 84.0% as against 16.0% Gram-positive organism.

Antibiogram (Sensitivity)

Table 2: Antibiogram

Antibiotics	No. of cases	Percentage
AK	18	88.5
AM	13	50.0
CF	9	34.6
CP	16	61.5
G	16	50.0
NF	2	61.5
NA	21	61.5
TMP-SMX	21	80.8

It is seen from the table that 7 (88.5%) strains were sensitive to AK followed by TMP-SMX (80.8%).

Outcome of patients with ASB

Table 3: Showing outcome of ASB

Sr. No	Outcome	n and Percentage %
1	Preterm labor	1(4%)
2	Preeclampsia	1(4%)
3	Anemia	2(8%)

Among 25 patients who were reported to be positive for ASB two had moderate anemia, one had severe pre-eclampsia at term and one had preterm labor.

Recurrent infection

Table 4: Showing the patients with recurrent infection, organisms isolated and treatment given after repeat culture

Sr. No.	Organism isolated on 1 st culture	Antibiotic given	Organism isolated on 2 nd culture	Antibiotic given
1	Klebsiella pneumonia	Amoxycillin	Klebsiella pneumoniae	Nitrofurantoin
2	Group B streptococcus	Amoxycillin	Group B streptococcus	Nitrofurantoin

This table shows, Two (8%) patients were reported with recurrent infection, which was identified when repeat urine culture and sensitivity was done after 2weeks.

DISCUSSION

The overall prevalence of asymptomatic bacteriuria (ASB) was 8.4% (25/300). This lies within the reported range of 3-10%.⁴ Lavanya *et al* (2002) and Mathew *et al* (1998) reported a prevalence of 8.4% and 6.8% in their studies conducted individually at AIIMS, Delhi and Christian Medical College, Vellore respectively.⁵ According to study done by Annie *et al* (2014) at Mangalore, Karnataka the prevalence of 13.2% was identified. In our study, the prevalence was seen to be higher in women belonging to the 22-25 years of age group. Similar results have been reported by Lavanya *et al* (2002) and Hazhir S (2007).⁵ However, Kass (1960) has reported an increase in the incidence with age. Stenquist *et al* (1989) concluded that the risk of acquiring bacteriuria in pregnancy increased with the period of gestation from 0.8% in the 12th week of gestation to 1.93% at the end of pregnancy. The risk of onset of bacteriuria was highest between 9th and 17th gestational weeks. The 16th gestational week was the optimal time for a single screening for bacteriuria because treatment at that time would provide the greatest number of bacteriuria free gestation weeks.¹⁰ In our study, the prevalence was seen to be higher in gravid 2 (44%). Similar result has been reported by Lavanya *et al* (2002).⁵ Poor personal hygiene was seen amongst the low socioeconomic class of patients who formed 92% of our study. Another study in Vishakapatnam, India revealed that prevalence of ASB increased as socioeconomic status of the patients' decreased.⁵ In the present study, the predominant pathogen isolated was E.Coli (52%) although at a lower rate from the generally 70-80% reported in the literature of Tugrul S *et al* (2005), Tutuncu *et al* (2005), Lavanya *et al* (2002).^{5,9,11} However Mathew's *et al* and Selassie (1998) reported 40% and 46% E.coli among the pathogens isolated respectively.^{12,13} The results of drug sensitivity revealed that 88.5% of isolates of different bacterial species were sensitive to amikacin followed by trimethoprim-

sulphamethoxazole (80.8%) nalidixic acid (69.2%) and cephalixin (61.5%). We found that the sensitivities of nitrofurantoin (61.5%), gentamicin (50%), amoxycillin (50%) and ciprofloxacin (30%) which are used as drugs of choice in treating asymptomatic bacteriuria were comparatively lower posing problems in treating these patients. Marlyn *et al* (2002) showed the sensitivity of ciprofloxacin, nitrofurantoin, cotrimaxazole and cephalixin were 85.7%, 100%, 100% and 70% respectively.⁸ Although the sensitivity pattern was found to be different in different studies, increased, resistance to amoxycillin was seen in most of the studies. Lavanya *et al* and Selassie reported sensitivity to amoxycillin was 23.3% and 9% respectively.⁵ The association between ASB and anemia was varying. In our study two patients (8%) were found to have moderate anemia. According to study done by Annie *et al* (2014) at Mangalore, Karnataka the incidence of ASB with anemia was 14.2%.^{14,19} In our study we had one (4%) case of ASB with severe pre-eclampsia. This case was reported in a primigravida with term gestation who had klebsiella pneumonia on urine culture. Incidence of 7.1% was reported in a study done by Annie *et al*. A significant difference in the rate of ASB was found in patients with pre-eclampsia (19%) in a study done by JA Hill *et al*.^{15,16,19} In our study one (4%) case had preterm labor. This case was reported in a multigravida with 32weeks of gestation who had E.coli growth on urine culture and was treated with cephalixin. In a study done by Annie *et al* the incidence of preterm labor reported in ASB was 28.5%.^{17,18,19} Two (8%) patients were reported with recurrent infection, which was identified when repeat urine culture and sensitivity was done after 2weeks. One patient had Klebsiella pneumonia and another had Group B Streptococcus on both the cultures. Initially both the patients were treated with Amoxycillin. A second course of antibiotic i.e. nitrofurantoin was given for a period of 7 days and urine culture repeated, which revealed no isolates.

CONCLUSION

Sensitivities of drugs which are used in treating asymptomatic bacteriuria were comparatively lower

posing problems in treating these patients. Prevalence of ASB in our study was 8.4% with high percentage of patients seen in third trimester. Majority of patients belonging to lower socioeconomic status. E.coli and klebsiella were the most common organisms isolated. In this study two patients had moderate anemia, one had severe pre eclampsia and one patient had preterm labor. Hence, it is necessary to identify the common pathogens causing ASB in pregnant women by simple screening methods and urine culture along with antibiotic sensitivity so that early treatment can be started and the complications can be prevented.

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