

Asymptomatic Bacteriuria in Pregnant Women: A prospective Study.

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ABSTRACT

Background: Asymptomatic bacteriuria is defined as bacterial monoculture in the quantity of ≥ 105 colony-forming units (CFU) per ml in two consecutive mid-stream clean-catch urine specimens or ≥ 102 CFU/ml in urine collected from single urinary bladder catheterization in completely asymptomatic patients. Its incidence is increased during pregnancy. Its diagnosis and treatment is important as untreated patient may go on to develop symptomatic urinary tract infections and pyelonephritis. Since patient is asymptomatic screening of all patients is the only way by which it can be diagnosed. **Methods:** We conducted this prospective study of 200 pregnant patients who attended our hospital for routine ANC checkups. Early morning clean catch Midstream urine sample was collected and analyzed by microscopy and culture sensitivity tests. Correlation of asymptomatic bacteriuria with gravidity and presence of risk factors was studied. Offending organisms and response to antibiotic treatment was studied. Data was tabulated and analyzed using Minitab version 17. P value less than 0.005 was taken as significant for statistical purposes. **Result:** Out of 200 studied cases 32 patients (16%) were found to be having asymptomatic bacteriuria. Out of studied cases most of the patients belonged to age group of 18-25 years (62.50%). The analysis of gravidity of the patients showed that 80 (40%) patients were primigravida while rest of the patients were multigravida (60 %). Asymptomatic Bacteriuria was more common in primigravida women as compared to multigravida females ($P=0.0006$). Out of 32 patients only 2 patients had associated risk factors. Most common offending organism isolated on urine culture was E.coli (68.75%) followed by Klebsiella (12.50%), staph Epidermidis (6.25%), Staph Aureus (6.25%), Actinobacteria (3.13%) and enterococcus faecalis (3.13%). **Conclusion:** Incidence of asymptomatic bacteriuria increases during pregnancy. Since its completely asymptomatic it can only be diagnosed by screening. Diagnosis and treatment of asymptomatic bacteriuria is essential as untreated case may affect maternal as well as fetal wellbeing.

Keywords: Asymptomatic Bacteriuria, screening, urine culture, Antibiotics.

INTRODUCTION

Asymptomatic bacteriuria is defined, according to recommendations developed by the IDSA (Infectious Diseases Society of America), as bacterial monoculture in the quantity of ≥ 105 colony-forming units (CFU) per ml in two consecutive mid-stream clean-catch urine specimens or ≥ 102 CFU/ml in urine collected from single urinary bladder catheterization in completely asymptomatic patients.^[1] Though it may remain asymptomatic for prolonged period of time in some cases it may progress to acute cystitis and pyelonephritis especially in pregnant women.^[2] During pregnancy there are changes in urinary tract including those in collecting system. Hydroureter, urinary stasis and dilatation of collecting system may predispose pregnant women to progress from

asymptomatic bacteriuria to symptomatic urinary tract infection. In severe cases pyelonephritis and even renal failure may ensue if patient is not treated properly.^[3] Maternal complications of asymptomatic bacteriuria are reported to be symptomatic urinary tract infections, pyelonephritis, anemia increased incidence of pregnancy induced hypertension and preterm labor. The adverse effects on fetus may include premature birth, low birth weight and perinatal death.^[4]

The risk factors for asymptomatic bacteriuria include previous history of urinary tract infections, diabetes mellitus, immunosuppression, low socioeconomic status, anatomical urinary tract abnormalities, sickle cell disease and increased parity. It is found in approximately 10% of pregnant women. Similarly, the incidence acute cystitis and acute pyelonephritis in pregnancy is reported to be 2-4% and 1-2% respectively.^[5] The diagnosis of asymptomatic bacteriuria is done by urine culture and sensitivity test. The midstream early morning urine sample is usually sent for microscopy and culture and sensitivity. The common organisms involved in causing asymptomatic bacteriuria include Escherichia coli, Klebsiella pneumoniae, coagulase-

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Gapchade; Asymptomatic Bacteriuria in Pregnant Women

negative Staphylococcus, and group B streptococci (GBS). Since asymptomatic bacteriuria is by definition asymptomatic the only way by which it can be detected is by routine screening of all pregnant women during antenatal visits to the hospital.^[6]

Because there is ample evidence obtained from various randomized controlled trials that effective antibiotic therapy of asymptomatic bacteriuria in pregnancy significantly reduces the risk of pyelonephritis and also prevent premature birth and incidence of low birth weight, routine screening for the presence of clinically significant bacteriuria in all pregnant women and its management by appropriate antibiotics therapy on the basis of gestational age and culture sensitivity reports is essential.^[7] Before treatment is started it is recommended that false positive reports due to contamination should be ruled out by analysis of a repeat urine sample (usually repeated within 1 week) to avoid unnecessary treatment.^[8]

The treatment of asymptomatic bacteriuria is important because untreated infections can lead to serious maternal and fetal complications. The antibiotics needs to be carefully selected depending upon the gestational age since during organogenesis some antibiotics may be associated with risk of fetal defects.^[9] In the second and third trimester, trimethoprim/sulfamethoxazole and nitrofurantoin are well tolerated but they should be avoided during later part of third trimester because of their propensity to cause neonatal hyperbilirubinemia.^[10]

We conducted this prospective study to find out the prevalence of asymptomatic bacteriuria and its bacteriological profile in pregnant women attending routine ANC clinics.

MATERIALS AND METHODS

This was a prospective study in which 200 pregnant women were included on the basis of inclusion and exclusion criteria. This study was conducted in the obstetrics and gynecology department of a tertiary care hospital situated in an urban area. Duration of study was 8 months. Written informed consent was taken from all the participants. Demographic details such as age, address, socioeconomic status and educational qualification of all the patients was noted. Gestational age, details of previous antenatal visits and previous history of urinary tract infection was noted. Detailed clinical examination was done. Routine investigation such as complete blood count, blood grouping and Rh typing and ultrasound examination was done in all the cases. A midstream clean catch urine sample was collected in a sterile container and sent for microscopic examination as well as culture and sensitivity. A growth of more than 10⁵ colony forming units was taken as significant bacteriuria. Offending organisms were noted by analyzing culture and sensitivity reports.

Patients were treated by appropriate antibiotics for 5 to 7 days. After Successful treatment repeat urine culture was done. The data was tabulated and analyzed. Statistical analysis was done using SSPE 16.0 software. Microsoft excel was used to prepare graphs and charts.

Inclusion Criteria

1. All pregnant women attending ANC clinic for routine visits.
2. Those who have given informed consent to be part of the study.
3. Age more than 18 years.

Exclusion Criteria

1. Age less than 18 years.
2. Symptomatic patients.
3. Those who refused consent.

RESULTS

The analysis of the patients diagnosed to be having asymptomatic bacteriuria showed that the most common age group of the studied cases was 18-25 years (52%) followed by 26-30 years (25%). Only 10 (16.67%) patients belonged to age group of more than 30 years. Mean age of the patients was found to be 24.66+/- 5.56 years.

Table 1: Age group of the studied cases.

Age groups	No. of Patients	Percentage
18 - 25 years	20	62.50%
26 - 30 years	6	18.75%
31 - 35 years	3	9.38%
> 35 years	3	9.38%
Total	32	100.00%

Mean Age \pm SD = 24.66+/- 5.56 years.

Amongst the 200 studied cases 80 (40%) patients were primigravida while rest of the patients were multigravida (60 %).

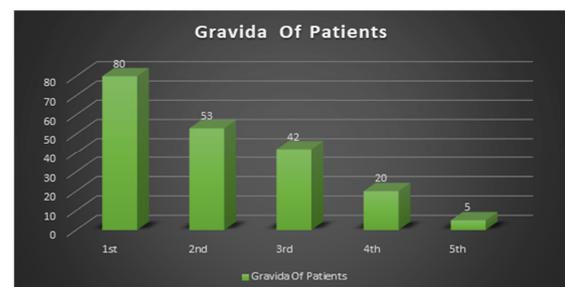


Figure 1: Gravida of the studied cases.

In this study Out of 200 studied cases asymptomatic bacteriuria was present in 32 (16%) patients. Out of the patients having asymptomatic bacteriuria 22 (11%) were primigravida while 10 (5%) were multigravida. Asymptomatic Bacteriuria was more common in primigravida women as compared to multigravida females. The difference was found to be statistically significant (P=0.0006).

Gapchade; Asymptomatic Bacteriuria in Pregnant Women

Table 2: Gravida of the patients and presence of asymptomatic bacteriuria.

Gravida	Asymptomatic Bacteriuria				P=0.0006 Significant
	Absent		Present		
	Number of Patients	Percentage	Number of Patients	Percentage	
1st Gravida	58	29.00%	22	11.00%	
2nd Gravida	47	23.50%	6	3.00%	
3rd Gravida	39	19.50%	3	1.50%	
4th Gravida	19	9.50%	1	0.50%	
5th Gravida	5	2.50%	0	0.00%	
Total	168	84%	32	16%	

Table 3: Gestational Age of the patients with Asymptomatic Bacteriuria.

Gestational Age	Asymptomatic Bacteriuria			
	Present		Absent	
	Number of Patients	Percentage	Number of Patients	Percentage
Upto 20 weeks	46	43.75%	14	43.75%
21-28 weeks	62	31.25%	10	31.25%
29-37 weeks	44	12.50%	4	12.50%
Above 37 weeks	16	12.50%	4	12.50%
Total	168	84%	32	16%

The Gestational of all the patients was noted and the patients were divided into those belonging to a gestational age less than 20 weeks, 20-28 weeks, 28-37 weeks and above 37 weeks. The most common gestational affected was below 20 weeks (7%) followed by 28-37 weeks (5%), 20-28 weeks (5%) and above 37 weeks (2%).

The history of factors which may predispose the patients for development of urinary tract infections such as history of past urinary tract infection, anatomical abnormalities or urinary tract or history of urolithiasis was asked for and noted. It was found that out of 32 cases with bacteriuria only 2 patients had such a history. While in patients who were not having bacteriuria 15 patients had history of past urinary tract infections or urolithiasis.

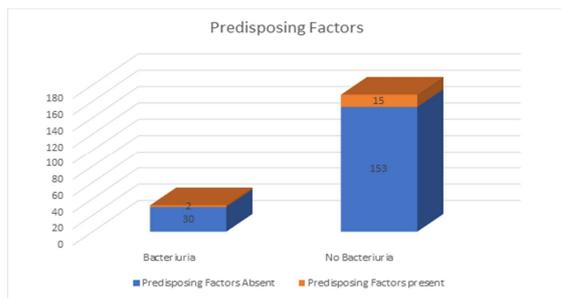


Figure 2: Predisposing Factors in studied cases.

Table 4: Association of Predisposing factors and Asymptomatic Bacteriuria.

	Predisposing Factors Absent	Predisposing Factors present	Total	P= >0.05 Not Significant
Bacteriuria	30	2	32	
No Bacteriuria	153	15	168	
Total	183	17	200	

The incidence of asymptomatic bacteriuria and presence of predisposing factors was analyzed it was found that h/o predisposing factor was not a significant factor causing asymptomatic bacteriuria. The difference between these 2 groups was not found to be statistically significant.

The analysis of urine culture reports showed that out of 32 cases with asymptomatic bacteriuria the most common offending organism was found to be E. coli which was seen in 22 (68.75%) patients followed by Klebsiella (12.50%), staph Epidermidis (6.25%), Staph Aureus (6.25%), Acitinobacter (3.13%) and enterococcus faecalis (3.13%).

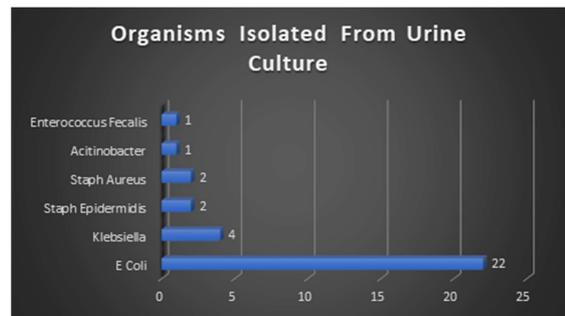


Figure 3: Organisms isolated on urine culture.

All patients diagnosed to be having asymptomatic bacteriuria were treated by course of 5 days of oral antibiotics. Antibiotics were chosen on the basis of gestational age and culture and sensitivity report. A repeat urine examination showed resolution of significant bacteriuria in all cases.

DISCUSSION

In our study of 200 pregnant women 32 (16%) patients were found to have asymptomatic bacteriuria. Various studies have reported the

Gapchade; Asymptomatic Bacteriuria in Pregnant Women

incidence of bacteriuria in pregnancy to be ranging from 5% to 50%. In the study conducted by Gebre-Selassie S the author found the incidence of asymptomatic bacteriuria to be 7%.^[11] Other authors have reported quite high prevalence of asymptomatic bacteriuria during pregnancy.^[12] Imade PE et al in their study of 1,228 pregnant women found that the prevalence of asymptomatic bacteriuria in pregnant women was 45.3%. In this study *Escherichia coli* was the most predominant organism followed closely by *Staphylococcus aureus*. Ciprofloxacin, Ceftriaxone and Augmentin were found to be the most effective antibiotics against the urinary isolates.^[13]

In our study asymptomatic bacteriuria was predominantly seen in primigravida patients. When statistical analysis was done it was found that primigravida patients were more likely to have asymptomatic bacteriuria as compared to other patients and the difference was found to be statistically significant ($P < 0.05$). Lavanya et al conducted a prospective study in which 500 antenatal women in their first or second trimesters were screened over a period of 2 years for asymptomatic bacteriuria.^[14] The authors found that Primigravida had highest percent culture positivity of 66.6%. The incidence was higher in less than 20 years age group i.e. 71.42%. Similar results were reported by other researchers also. Lata R. Chandel et al in their study of 463 asymptomatic pregnant females with a period of gestation (POG) 28 weeks or less found that Out of positive culture results, 52.9% were primigravida and 47.1% were multigravida.^[15]

In our study the most common offending organisms were found to be *E. coli* which was seen in 22 (68.75%) patients followed by *Klebsiella* (12.50%), *Staph Aureus* (6.25%), *Staph Epidermidis* (6.25%), *Staph Aureus* (6.25%), *Acetivobacter* (3.13%) and *enterococcus faecalis* (3.13%). *E. coli* was found to be most common offending organisms in majority of the studies conducted by various authors.^[16] Turpin et al in their study of 220 pregnant women found that 16 had significant bacteriuria giving a prevalence rate of 7.3%.^[17] The dominant bacteria isolates were *E. coli* (37%) and *Staph aureus* (31%). Similarly, in a study conducted by Sharma P et al found that majority of cases of acute pyelonephritis during pregnancy were caused by *E. coli*.^[18]

We treated all the patients by appropriate oral antibiotics for 5 days. Repeat urine examination and culture was done which showed resolution of asymptomatic bacteriuria in all the cases. Many studies have reported that asymptomatic bacteriuria in pregnancy may progress to pyelonephritis and puerperal sepsis if not treated properly emphasizing the importance of diagnosis and management of bacteriuria in pregnancy. Izuchukwu KE et al in their study of 220 pregnant women found that incidence of puerperal sepsis was more common in patients

having asymptomatic bacteriuria as compared to those without bacteriuria.^[19] The connection between low birth weight, premature delivery and asymptomatic bacteriuria has been reported by many authors. Romero R et al conducted an extensive review of literature with an objective to find out whether untreated bacteriuria adversely affects the pregnancy outcome.^[20] The authors concluded that clinical and epidemiologic evidence indicates a strong association between untreated asymptomatic bacteriuria and LBW/preterm delivery and that antibiotic treatment is effective in reducing the occurrence of LBW.

CONCLUSION

Asymptomatic bacteriuria is more commonly seen in pregnancy. Its diagnosis and treatment is important as untreated cases may progress to symptomatic infection and may affect foeto-maternal wellbeing. A simple 5 days of appropriate antibiotics is associated with resolution of asymptomatic bacteriuria in almost all the cases. Since the patients of asymptomatic bacteriuria are entirely asymptomatic screening by urine examination is a crucial part of diagnosis of these cases.

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