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Management of asymptomatic bacteriuria in pregnancy

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Abstract

Introduction: Asymptomatic bacteriuria refers to the presence of actively multiplying bacteria within urinary tract in an asymptomatic woman. Incidence during pregnancy varies from 2-7% which is similar to that in non-pregnant women and itdepends on parity, race, and socioeconomic status.

Aims & Objectives: To Study the Relative frequency of Asymptomatic Bacteriuria in Pregnant women of6-20 weeks of gestation.To Identify the Organisms grown in Urine culture and to assess the antibioticSensitivity pattern.

Materials & Methods: This is a Descriptive hospital based follow up study conducted in the Dept of Obstetrics and Gynaecology, KMCT Medical college from April 2019 to March 2020. The sample was include all those pregnant women of 6-20 weeks of gestation who are asymptomatic but with positive urine C&S.All pregnant women of 6-20 weeks of gestation coming for antenatal checkup was asked to collect clean catch, midstream urine samples in sterile wide mouthed containers with lid & it was sent for Urine routine examination,Culture & sensitivity Study to the Department of Microbiology.

Results: Study included 150 patients, out of which 110 (73.3%) were primi and 40 (26.7%) were multi paras. 104 patients were of gestational age between 12 – 20 weeks and 46 patients in 6-12 weeks of gestational age.The commonest organism detected in the Group A was E.coli giving anincidence of 90%, followed by Klebsiella pneumonia which was21.43%.There were two cases of coagulase negative staphylococcus (14.28%) andone case ofalpha hemolytic streptococcus (7.14%).In the study 5 patients had abnormal USG KUB. They were having features of chronic renal disease.Culture and sensitivity results were 99.8% sensitive to nitrofurantoin. And after antibiotic treatment 143 patients (95.3%) urine culture became sterile and 7 patients (4.7%) infection persisted.

Conclusion: Asymptomatic bacteriuria in pregnancy is associated with maternal and fetal morbidity.It can be diagnosed by urine culture and sensitivity.Treatment with appropriate antibiotics prevent these complications.In this study prevalence of ASB in pregnant women of 6- 20 weeks of gestation is around 17.8%.E.coli,Klebsilla, Proteus, Staph aureus and Streptococcus were the organisms isolated in urine culture.E. coli was identified as the

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commonest organism in the urine culture in all the age groups irrespective of the gestational age and socio economic status.

Keywords: Urinary Tract Infections, Pregnancy, E.coli,Klebsilla, Proteus.

Introduction

Asymptomatic bacteriuria refers to the presence of actively multiplying bacteria within urinary tract in an asymptomatic woman. Incidence during pregnancy varies from 2-7%[(1)] which is similar to that in non-pregnant women and itdepends on parity, race, and socioeconomic status.If asymptomaticbacteriuria is not treated, approximately 25% of women will subsequentlydevelop acute symptoms of an infection during pregnancy.[(2)]There is relative absence of acute symptoms of urinary tract infections in the presence of 10^5CFU/ml of urine in a bacterial culture[(3)].

Pregnant woman with asymptomatic bacteriuria if not treated are more likely to develop preterm delivery, low birth weight infants, intra uterine growth restriction[(4)], anaemiaacute pyelonephritis,acute cystitis, hypertensive disease of pregnancy etc. So inorder to prevent adverse obstetric outcome and to reduce the complications in mother we need to diagnose it with urine C&S, identify the organism and treat it early.

Screening of asymptomatic subjects for bacteriuria is appropriates bacteriuria has adverse outcomes that can be prevented byantimicrobial therapy. Apart from that, even the progression of theasymptomatic bacteriuria to the symptomatic UTI in the later life can beprevented.[(5)]

Urinary tract infections (UTIs) are common in pregnant women. By convention, UTI is defined either as a lower tract (acute cystitis) or upper tract (acute pyelonephritis) infection.[(6)]

The American Academy of Paediatrics, ACOG (2007) as well as U.S Preventive Task Force (2006) recommend screening for bacteriuria in the first prenatal visit[(7)].

Aims & Objectives: To Study the Relative frequency of Asymptomatic Bacteriuria in Pregnant women of6-20 weeks of gestation.To Identify the Organisms grown in Urine culture and to assess the antibioticSensitivity pattern.

Materials & Methods

This is a Descriptive hospital based follow up study conducted in the Dept of Obstetrics and Gynaecology, KMCT Medical college from April 2019 to March 2020.

Inclusion Criteria:

The sample will include all those pregnant women of 6-20 weeks of gestation who are asymptomatic but with positive urine C&S.

ISSN: 0975-3583, 0976-2833 VOL13, ISSUE04, 2022

Exclusion criteria:

All pregnant women with symptoms of urinary tract infection.
All pregnant women who are already on antibiotics (for any cause).
All pregnant women who are unwilling to participate in the study

Method of Study & Data Collection:

- All pregnant women of 6-20 weeks of gestation coming for antenatal checkup was asked to collect clean catch, midstream urine samples in sterile wide mouthed containers with lid & it was sent for Urine routine examination,Culture & sensitivity Study to the Department of Microbiology.
- Pus cell count of uncentrifuged urine
  To estimate pyuria, a Neubaeuers counting chamber was used. A pus cell count of >10 cells per micro litre of urine corresponds to an excrement rate of $4*10^5$ leukocytes per hour which was considered significant.
- Gram staining of uncentrifuged urine
  A drop of uncentrifuged well mixed urine was taken on a clean grease free slide and stained by Grams method of staining and examined under the oil immersion objective of the microscope (examining 20 fields). Presence of 1 bacteria per field corresponds to $>10^5$ CFU/ml.
- Culture
  Agar plate method is considered gold standard in diagnosing bacteriuria. A loopful of uncentrifuged urine was streaked on to the surface of blood agar and CLED agar. After incubating aerobically for 24 hrs at 37*C, colony forming unit (CFU) per ml of urine was noted. Bacterial isolates were identified by standard procedures and subjected to antibiotic susceptibility by Kirby Bauer s test
- Urine culture & antibiotic sensitivity pattern results were collected from the patient or from the Department of microbiology in person and the results were properly analysed.
- All those pregnant women with confirmed bacteriuria as per urine culture results were included in the study group & they was evaluated with a detailed clinical history, thorough clinical examination and relevant investigations.
- The Different Organisms grown in Urine culture was identified & its antibiotic sensitivity pattern was delineated and was treated accordingly.
- After the course of antibiotics they was followed up with urine C&S to reassess the response to treatment.
- The pregnant women with documented urine culture positive cases was followed up till their delivery to assess various complications.

Statistical Analysis

The data Collected is analyzed statistically by computing the sample statistics viz., mean, median, standard deviation, percentages wherever possible. The inference is obtained by computing the statistical test vizAnova test and Chi-square test. Statistical analysis was carried out using SPSS version 25.0.

ISSN: 0975-3583, 0976-2833 VOL13, ISSUE04, 2022

Results

Study included 150 patients, out of which 110 (73.3%) were primi and 40 (26.7%) were multi paras. 104 patients were of gestational age between 12 – 20 weeks and 46 patients in 6-12 weeks of gestational age. Other characteristics are shown in table given below.

Table 1: Socio demographic Background

Variables	**Count**	**Percent**
PARITY		
Primi	110	73.3
Multi	40	26.7
AGE		
<20	29	19.3
20-35	108	72
>35	13	8.7
EDUCATION		
Undergraduate	63	42
Graduate	82	54.7
Post graduate	5	3.3
BMI		
18-22.9	123	82
23-24.9	20	13.3
>25	7	4.7
SOCIOECONOMIC		
Low	92	61.3
Middle	49	32.7
High	9	6
RELIGION		
Hindu	87	58
Muslim	48	32

ISSN: 0975-3583, 0976-2833 VOL13, ISSUE04, 2022

In the study 29 patients (19.3%) were below 20 years of age. 128 patients(72%) were between 20 -35 years and 13 patients (8.7%) were above 35 years of age.In the study 63 patients (42%) were under graduates, 82 patients were (54.7%) graduates and 5 patients(3.3%) were post graduates.123 patients (82%) were with BMI 18-22.9kg/m^2, 20 patients (13.3%) with BMI 23-24.99kg/m^2 and 7 patients were with BMI >25kg/m^2.92 patients (61.3%) belonged to low socio-economic class, 49 (32.7%) in middle class and 9 (6%) belonged to high socio economic class.87 patients were Hindus (58%), 48 were Muslims (32%), and 15 were Christians (10%).

Table 2: Comorbidities

Comorbidities	**Count**	**Percent**
PIH		
No	143	95.3
Yes	7	4.7
GDM		
No	129	86
Yes	21	14
RENAL DISEASE		
No	142	94.7
Yes	8	5.3

In the study, 7 patients had PIH (4.7%), 21 patients(14%) were with GDM and 8 patients (5.3%) had history of renal disease.

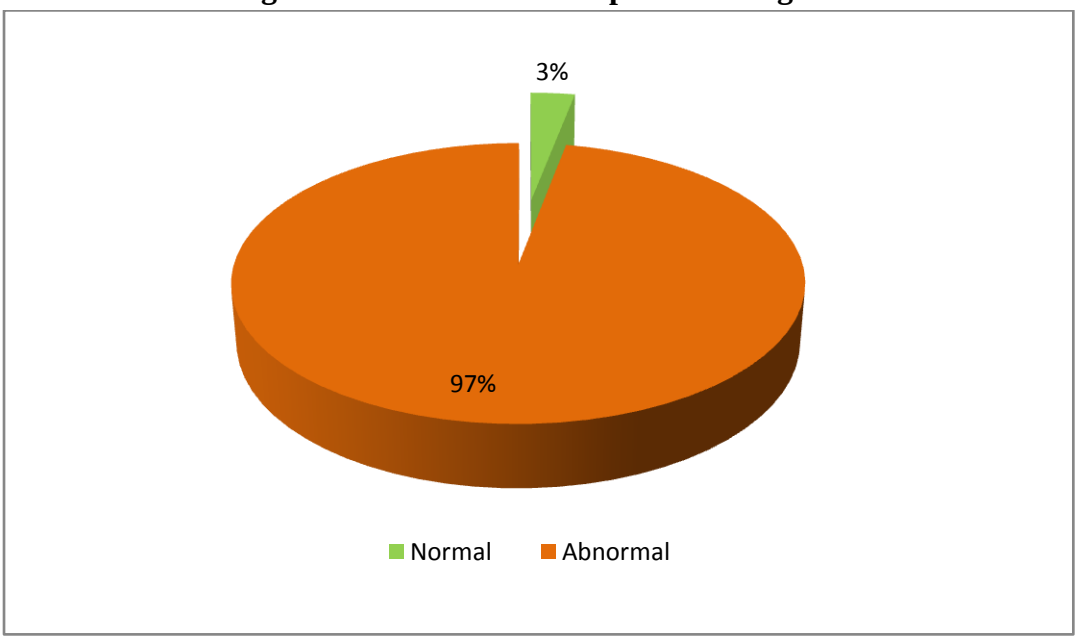
Table 3: Urine C & S before treatment

Urine culture before Rx	**Count**	**Percent**
E.coli	135	90.0
Klebsiella	7	4.7
Proteus	3	2.0
Staph	3	2.0
Strept	2	1.3

ISSN: 0975-3583, 0976-2833 VOL13, ISSUE04, 2022

The commonest organism detected in the Group A was E.coli giving anincidence of 90%, followed by Klebsiella pneumonia which was21.43%.There were two cases of coagulase negative staphylococcus (14.28%) andone case ofalpha hemolytic streptococcus (7.14%).

Chart 10: Percentage distribution of the sample according to USG KUB



In the study 5 patients had abnormal USG KUB. They were having features of chronic renal disease.

Urine culture after treatment

Culture and sensitivity results were 99.8% sensitive to nitrofurantoin. And after antibiotic treatment 143 patients (95.3%) urine culture became sterile and 7 patients (4.7%) infection persisted.

Table 4: Percentage distribution of the sample according to urine culture after treatment

Urine culture after Rx	Count	Percent
Cured	143	95.3
Not cured	7	4.7

Table 5: Percentage distribution of the sample according to outcome

Outcome	Count	Percent
Good	71	47.3

ISSN: 0975-3583, 0976-2833 VOL13, ISSUE04, 2022

Low birth wt	27	18.0
Pre termlabour	20	13.3
IUGR	16	10.7
Pre eclampsia	16	10.7

Discussion

In our study conducted, around 1670 pregnant patients who attended the GynaecologyOPD/ IP were scrutinized out of nearly 150 patients satisfied the inclusion criteria of the study and had a confirmed diagnosis of asymptomatic bacteriuria. Hence the prevalence of ASB. In this part of the state is around 17.8%. It was tallying with the prevalence estimated in the other studies. Study conducted by Bachman had 2-7% andKhatun et al had 30% incidence of asymptomatic bacteriuria. In a study conducted in JawaharlalNehru Medical College, (JNMC)Karnataka significant bacteriuria was present in 11% of the study.[8] In a study conducted in Chennai Medical College (CMC),Thiruchirappally prevalence was 13%.[9]Study conducted in Deccan College of Medical Sciences (DCMS) Hyderabad had a prevalence of 16.8%.[10]

In the age group of 20-35 years patient comes to the tune of 72% and lowest in more than 30 years.This is probably because this comes under reproductive age group and most of the patients had their pregnancy during this period. In JNMC study highest number of culture positive cases among pregnant women were in the age group of 26-35 years (57%).

Majority (57%) had an educational standard of graduation. Highest incidence was seen among primipara 110 patients (73.3%). Little et al in his studyhave found it to be more common in primigarvida. [11]

Most (61.3%) of the patients with ASB in the present study belonged to low socio economic group and there were only 9patients (6%) of high socio economic status of ASB. Whalley et al[12]proved this in his study. In the study conducted in Pondicherry Institute of Medical Sciences in 2011 92.6% patients belonged to low socio economic class. Most patients in the study had a normal BMI (18-22.9).

The comorbidities associated were also looked at. 7 patients (4.7%) had PIH, 21 (14%) patients had GDM and 8 patients (5.3%) had associated renal disease. Out of 150 patients 11 patients (7.3%) had anemia (Hb 10gm/dl).Majority (96.7%) had a normal USG KUB. Highlighting the fact that majority had no local or systemic complications.

The first trimester urine culture remains the screening test of choice. The American Academy of Paediatrics, ACOG (2007) as well as U.S Preventive Task Force (2006) recommend screening for bacteriuria in the first prenatal visit[13].

ISSN: 0975-3583, 0976-2833 VOL13, ISSUE04, 2022

135 persons (90%) had E. coli growth culture in urine, 4.7% had Klebsiella, 2% Proteus and 2% Staph aureus. Hence E.coli was identified as the prominent causative organism of ASB. This finding was tallying with evidence given in the text books. Also, literature and other studies conducted.

In the study conducted in JNMC, Karnataka, the commonest isolated organism was E.Coli in 24 patients (72.72%), followed by S.aureus in 4 patients (12.12%), Klebsiella pneumonia in 2 cases (6.07%). In this study conducted in DCMS, Hyderabad the commonest isolates were *E. coli* (69%) followed by *Staphylococcus saprophyticus*(15%) and *Enterobacter*species(2%). In a study conducted in Pondicherry Institute of Medical Sciences in 2011. The dominant isolates in the study was Escherichia coli which was 57.1%.Others were klebsiellapneumoniae, coagulase negative staphylococcus and alpha hemolytic streptococci which were found in less numbers.The study found Nitrofurantoin effective for most of the isolates (99.7%).

Based on C & S all these patients were treated with antibiotics. Around 95.3% got cured. Culture turned sterile after treatment with antibiotics. Hence it was concluded that majority had response to the drug treatment.

Preterm births in the current study was 13.3% in ASB patients. This was confirmed by Robert Mittendorf et al[(14)]by a meta analysis. Findings from Cardiff birth survey[(15)]which prospectively studied 25,844 births and reported that ASB is not associated with preterm delivery. The authors concluded that if ASB did not progress to pyelonephritis, it would not be associated with preterm births.

Low birth weight was seen in 18% of the present study. Romero et al[(16)]said that there was strong association between untreated urinarytract infection and low birth weight. IUGR was seen in 10.7% in the study and pre eclampsia in 10.7% of cases.Between 20-35 age group, 47.2 % had good outcome and 52.8% had poor outcome. Greater than 35 years 61.5 % had good outcome and 38.5 % had poor outcome. This was analysed with chi square test and a ‘p’ value of 0.481 was obtained. Hence outcome and age group comparison had no statistical significance. Outcome was compared with socio economic status using chi square test and a ‘p’ value of 0.486 was obtained which was also statistically not significant. Outcome was compared with gestational age and a ‘p’ value of .664 was obtained which was also statistically not significant.

Conclusions

Asymptomatic bacteriuria in pregnancy is associated with maternal and fetal morbidity.It can be diagnosed by urine culture and sensitivity.Treatment with appropriate antibiotics prevent these complications.In this study prevalence of ASB in pregnant women of 6- 20 weeks of gestation is around 17.8%.E.coli,Klebsilla, Proteus, Staph aureus and Streptococcus were the organisms isolated in urine culture.E. coli was identified as the commonest organism in the urine culture in all the age groups irrespective of the gestational age and socio economic

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status.Majority(45.3%) responded to antibiotic treatment and had a sterile urine culture documented on follow up.47.3% had good outcome in the form of normal delivery, 52.7 % had some complications and low birthweight (18%) and pretermlabour was the commonest complication noted.

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