



Original Research Article

Asymptomatic bacteriuria in antenatal women attending tertiary care hospital at Hyderabad

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ABSTRACT

Introduction: Urinary tract infection (UTI) is one of the most common bacterial infections during pregnancy. Increased risk of UTI in pregnant women is due to anatomical changes and physiological adaptations during pregnancy. Untreated asymptomatic bacteriuria (ASB) in pregnancy predisposes to symptomatic UTI in 25% of infected women. Early diagnosis and appropriate treatment of ASB curbs the risk of pyelonephritis, eclampsia, preterm delivery and adverse fetal outcomes.

Aim: This prospective study was conducted to determine the occurrence of ASB, its etiological agents and their antibacterial susceptibility pattern in selected group of pregnant women.

Setting & Design: Prospective study was carried out on in department of Microbiology at ESIC medical college, Telangana from September 2016 to March 2017.

Materials and Methods : Study population included total of 346 antenatal women of gestational ages 28 weeks or less with no symptoms of urinary tract infection (UTI) attending for antenatal checkup. All bacterial isolates showing significant growth were identified by standard biochemical methods. The antibiotic sensitivity testing of the isolates was done by Kirby Bauer method according to CLSI guidelines.

Result: Among total of 346 antenatal women screened 85.5% samples were sterile. Significant bacterial growth was found in 38 (11%) cases. The age, gravida and trimester of participants did not have any statistical significance on ASB in present study. *Escherichia coli* (42.1%) and *Enterococcus faecalis* (42.1%) were most common isolates. Antibiotic sensitivity pattern of *Escherichia coli* revealed good sensitivity to cefotaxime (93.75%), amikacin (87.5%), nitrofurantoin (87.5%) and cotrimoxazole (81%). Antibiotic sensitivity pattern of *Enterococcus faecalis* showed good sensitivity of 75% to nitrofurantoin and 67.5% to ampicillin, ciprofloxacin and high level gentamicin. *Staphylococcus aureus* showed 100% sensitivity to betalactam antibiotics and aminoglycoside.

Conclusion: Every pregnant woman in each trimester should have a urine culture done and detected cases should be treated according to the antibiotic susceptibility test in order to reduce the perinatal and maternal morbidity and mortality.

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1. Introduction

Urinary tract infection (UTI) is one of the most common bacterial infections during pregnancy. It can be symptomatic or asymptomatic. Increased risk of UTI in pregnant women is due to anatomical changes and physiological adaptations during pregnancy.¹ Untreated asymptomatic bacteriuria

(ASB) in pregnancy predisposes to symptomatic UTI in 25% of infected women.² Early diagnosis and appropriate treatment of ASB curbs the risk of pyelonephritis, eclampsia, preterm delivery and adverse fetal outcomes. This prospective study was conducted to determine the occurrence of ASB, its etiological agents and their antibacterial susceptibility pattern in selected group of pregnant women.

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2. Materials and Methods

The present study was carried out in the department of Microbiology at ESIC medical college, Telangana from September 2016 to March 2017. Study population included total of 346 antenatal women of gestational ages 28 weeks or less with no symptoms of urinary tract infection (UTI) attending for antenatal checkup. Patients with fever, incontinence or renal stones, diabetes, hypertension, recent history of antibiotic intake were excluded from study. Data regarding age, gravida, trimester, associated risk factors were obtained from standard proforma in requisition form filled by clinician. Clean catch midstream urine sample were cultured and identified by standard microbiological methods. Semi-quantitative culture of urine samples was done on blood and MacConkey agar by standard loop technique.³ Growth was interpreted as significant in Gram negative bacteria if colony count was $\geq 10^5$ colony forming unit per milliliter (CFU/ml) of urine. In Gram positive bacteria colony count of 10^2 CFU/ml of urine was considered significant. All bacterial isolates showing significant growth were identified by standard biochemical methods.⁴ The antibiotic sensitivity testing (AST) of the isolates was done by Kirby Bauer method according to CLSI guidelines.⁵

3. Result

Among total of 346 antenatal women screened 85.5% samples were sterile. Significant bacterial growth was found in 38 (11%) cases, 12(3.5%) cases showed insignificant growth of mixed bacterial flora. The age, gravida and trimester of participants did not have any statistical significance on ASB in present study. *Escherichia coli* (42.1%) and *Enterococcus faecalis* (42.1%) were most common isolates followed by *Staphylococcus aureus* (7.9%), *Klebsiella pneumonia* (5.3%) and *Enterobacter aerogenes* (2.6%) (Table 1). Antibiotic sensitivity pattern of most common gram negative bacteria, *Escherichia coli* revealed good sensitivity to cefotaxime (93.75%), amikacin (87.5%), nitrofurantoin (87.5%) and cotrimoxazole (81%). Sensitivity to ampicillin (25%), cefazolin (37.5%), amoxycylav (56%), norfloxacin (68.75%) and ciprofloxacin (75%) was reduced (Table 2). Antibiotic sensitivity pattern of most common gram positive bacteria, *Enterococcus faecalis* showed good sensitivity of 75% to nitrofurantoin and 67.5% to ampicillin, ciprofloxacin and high level gentamicin. *Staphylococcus aureus* showed 100% sensitivity to betalactam antibiotics and aminoglycoside (Table 3).

4. Discussion

Urinary tract infections are most common infections in females especially in pregnancy. ASB in pregnancy is known to cause grave obstetric complications. Hence it is

Table 1: Bacterial agents isolated

S.No.	Bacterial	N (%)
1	<i>Escherichia coli</i>	16 (42.1%)
2	<i>Enterococcus faecalis</i>	16 (42.1%)
3	<i>Staphylococcus aureus</i>	3 (7.8%)
4	<i>Klebsiella pneumoniae</i>	2 (5.3%)
5	<i>Enterobacter aerogenes</i>	1 (2.7%)
Total		38(100%)

very important to screen all pregnant women for bacteriuria in every trimester and administer appropriate treatment in order to prevent perinatal and maternal complications. Incidence of ASB in our study was 10.9%. Different Indian and international studies showed incidence range of ASB as 2 to 50%.^{6–13} (Table 4) Difference in incidence in studies across the world and in same country is due to differences in geographical location, social behavior, level of education, study population and sample size of participants. The age, gravida and trimester of participants did not have any statistical significance on ASB in present study. The reason for age distribution not having significant association with ASB in present study may be due to the factor that majority of antenatal women enrolled in this study belonged to 20-30 years than those between 31-45 years age group. The parity and gestational age not having significant association with ASB in present study correlated with previous researchers.^{12,14,15} In present study both Gram negative and Gram positive bacteria were predominantly responsible for ASB during pregnancy. The most common Gram negative uropathogen was *Escherichia coli* (42.1%). Different studies done by Verma et al,⁶ Sujatha et al,⁷ Chandel et al,⁸ Shalima et al,⁹ Ali et al¹⁰ and Bose et al¹¹ showed *Escherichia coli* as most common uropathogen. The most common Gram positive uropathogens was *Enterococcus faecalis* (42.1%). This finding was in agreement with other studies.^{6,9,15,16} *Escherichia coli* and *Enterococcus faecalis* are fecal flora that colonize the periurethral area. Profound anatomical and physiological changes during pregnancy result in urinary stasis and dysfunctional vesico-ureteral reflux that aid in UTI by fecal flora. Antibiotic sensitivity pattern of gram negative uropathogens showed good susceptibility to nitrofurantoin, cotrimoxazole, cefotaxime and aminoglycosides. Frequently prescribed antibiotics like amoxycylav, cefuroxime and norfloxacin showed increased resistance due to selective antibiotic pressure. Antibiotic sensitivity pattern of *Enterococcus faecalis* showed good susceptibility to nitrofurantoin, moderate sensitivity to routinely prescribed antibiotic like amoxycylav, amikacin, ciprofloxacin and poor susceptibility to norfloxacin. Antibiotic sensitivity pattern of *Staphylococcus aureus* showed good susceptibility to beta-lactam antibiotics. Antibiotic susceptibility pattern varies from one region to other based on local factors like overt or inappropriate use of selected antibiotics, patient compliance, over the

Table 2: Antibiotic sensitivity pattern of Gram negative bacteria

Antibiotics	Bacterial isolates					
	E.coli(16)		Klebsiella (2)		Enterobacter (1)	
	S	NS	S	NS	S	NS
AMP	4 (25%)	12 (75%)	NA	NA	NA	NA
AMC	9 (56%)	7 (44%)	0	2 (100%)	0	1 (100%)
COT	13 (81%)	3 (1.9%)	1 (50%)	1 (50%)	0	1 (100%)
NIT	14 (87.5%)	2 (12.5%)	0	2 (100%)	0	1 (100%)
NX	11 (68.75%)	5 (31.25%)	2 (100%)	0	1(100%)	0
CZ	6 (37.5%)	10 (62.5%)	0	2 (100%)	0	1(100%)
CXM	11 (68.75%)	5 (31.25%)	0	2 (100%)	0	1(100%)
CTX	15 (93.75%)	1 (6.25%)	1 (50%)	1 (50%)	0	1(100%)
AK	14 (87.5%)	2 (12.5%)	2 (100%)	0	1(100%)	0
CIP	12 (75%)	4 (25%)	1 (50%)	1 (50%)	1(100%)	0
PIP/TAZ	16 (100%)	0	2 (100%)	0	1(100%)	0

S: Sensitive, NS: Nonsensitive, NA: Not applicable

AMP: Ampicillin, AMC: Amoxyclav, COT: Cotrimoxazole, NIT: Nitrofurantoin, NX: Norfloxacin, Cz: Cefazolin, CXM: cefuroxime, CTX: cefotaxime, AK: Amikacin, CIP: Ciprofloxacin, PIP/TAZ: piperacillin -tazobactam

Table 3: Antibiotic sensitivity pattern of Gram positive bacteria:

Antibiotics	Bacterial isolates			
	Enterococcus faecalis(16)		Staphylococcus aureus (3)	
	S	NS	S	NS
AMP / AMC	10(62.5%)	6 (37.5%)	2 (67%)	1 (33%)
NIT	12 (75%)	4 (25%)	1 (33%)	2 (67%)
NX	9 (56%)	7 (44%)	1 (33%)	2 (67%)
CIP	10 (62.5%)	6 (37.5%)	2 (67%)	1 (33%)
HLG/AK	10 (62.5%)	6 (37.5%)	3 (100%)	0
LZ	16 (100%)	0	3 (100%)	0
COT	NA	NA	2 (67%)	1 (33%)
CX	NA	NA	3 (100%)	0
VA	16 (100%)	0	3 (100%)	0

S: Sensitive, NS: Nonsensitive, NA: Not applicable

AMP: Ampicillin, NIT: Nitrofurantoin, NX: Norfloxacin, CIP: Ciprofloxacin, HLG: High level gentamicin, AK: Amikacin, LZ: Linezolid, COT: Cotrimoxazole, CX: Cefoxitin, VA: Vancomycin

Table 4: Incidence of ASB in various studies

Study	Study population (N)	Incidence of ASB (%)
Present study	346	10.9%
Verma A et al ⁶	220	12.27%
R Sujatha et al ⁷	300	7.3%
Chandel et al ⁸	463	7.34%
Shalima et al ⁹	637	49.5%
Ali et al ¹⁰	358	15.6%
Bose AM et al ¹¹	555	4.6%
Imade et al ¹²	1228	45.3%

counter availability and prescription of antibiotics without laboratory guidance.

5. Conclusion

Every pregnant woman in each trimester should have a urine culture done and detected cases should be treated according to the antibiotic susceptibility test. In present study both gram negative and gram positive bacteria were predominantly responsible for ASB. Culture plays a pivotal role as choice of antibiotic varies with the uropathogen isolated. Increasing resistance to commonly used antibiotics shows selective pressure due to their increased prescription. Antibiotic susceptibility testing will aid policy makers to determine the antibiotics to be used for ASB thereby reducing the perinatal and maternal morbidity and mortality.

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None.

8. Conflict of Interest

None.

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