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Assessment of Bacterial Isolates in Urinary Tract Infection among Pregnant Women

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ABSTRACT

Background: To assess bacterial isolates in urinary tract infection among pregnant women.

Material and Methods: One hundred thirty antenatal women between 12-16 weeks of gestation were enrolled. A clean catch mid-stream urine specimen was collected from all subjects. Colony count of 100 or more equivalent to ≥ 105 CFU/ml was considered as significant bacteriuria.

Results: Age group 18- 21 years comprised of 60 subjects, 22- 25 years had 39, 26- 29 years had 25 and 30- 33 years had 6 subjects. The difference was significant (P<0.05). Asymptomatic bacteriuria (ABU) was seen in 30 and symptomatic bacteriuria in 55 subjects. The prevalence found to be 65.3%. The difference was significant (P< 0.05). Bacterial isolates were, Staphylococcus aureus was 35% and 42%, Escherichia coli was 35% and 30%, Streptococcus Spp. was 15% and 22%, Pseudomonas Spp. was 10% and 4% and Acinetobacter Spp. was 5% and 2% in ABU and symptomatic bacteriuria patients.

Conclusion: Urinary tract infection is quite common in pregnancy. Common isolates seen are Staphylococcus aureus, Escherichia coli, Streptococcus spp., pseudomonas spp., candida spp. and Acinetobacter spp.

Keywords: Staphylococcus aureus, Escherichia coli, Urinary tract infection.

INTRODUCTION

Urinary tract infection (UTI) is an infection caused by the presence and growth of microorganisms anywhere in the urinary tract. It is usually due to bacteria from the digestive tract which climb the opening of the urethra and begin to multiply to cause infection. As compared to men, women are more susceptible to UTI, and this is mainly due to short urethra, absence of prostatic secretion, pregnancy and easy contamination of the urinary tract with faecal flora.[1]

The urinary tract infections (UTI) are the commonly associated with pregnancy. Asymptomatic UTI develops in 2-12% of pregnancy and it's a major predisposition to the development of pyelonephritis associated with complications like preterm labour and low birth weight baby.[2] In asymptomatic bacteriuria (ASB) there is presence of minimum 10^5 colony forming units (CFU) per ml of urine, of a single uro-pathogen in a midstream urine without symptoms and signs such as dysuria, frequency of micturition, fever, loin pains, renal angle tenderness, suprapubic pain and tenderness.[3]

Asymptomatic bacteriuria (ABU) is a condition characterized by presence of bacteria in two consecutive clear-voided urine specimens both yielding positive cultures ($\geq 10^5$ CFU/ml) of the same uro-pathogen, in a patient without classical symptoms.[4] E. coli is the major etiologic agent in causing UTI, which accounts for up to 90% of cases. P. mirabilis, Klebsiella species, P. aeruginosa and Enterobacter species are less frequent offenders. Less commonly,

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Enterococci, G. vaginalis and U. urealyticum are also known agents in UTIs. Gram-positive organisms are even less common in which Group B Streptococcus, S. aureus, S. saprophyticus and S. haemolyticus are recognized organisms.[5,6] We performed this study to assess bacterial isolates in urinary tract infection among pregnant women.

MATERIAL & METHODS

One hundred thirty antenatal women between 12-16 weeks of gestation were enrolled in this prospective, observational study. Ethical clearance certificate was obtained from institutional ethical committee. All were informed regarding the study and written consent was obtained.

Demographic data such as name, age etc. was recorded. A clean catch mid-stream urine specimen was collected from all subjects. Each of the specimens was subjected to culture by the semi-quantitative standard loop technique on Blood agar & MacConkey agar using 4 mm internal diameter loop. Culture plates were incubated aerobically at 37^{o} C for 24 hours. Culture plates without visible growth were further incubated for additional 24 hours before being discarded. Colony count of 100 or more equivalent to $\geq 10^{5}$ CFU/ml and considered as significant bacteriuria. The results were compiled and subjected for statistical analysis using Mann Whitney U test. P value less than 0.05 was set significant.

RESULTS

Table I Age wise distribution

Age group (years)	Number	P value
18-21	60	0.01
22-25	39	
26-29	25	
30-33	6	

Age group 18- 21 years comprised of 60 subjects, 22- 25 years had 39, 26- 29 years had 25 and 30- 33 years had 6 subjects. The difference was significant (P<0.05) (Table I).

Table II Prevalence of UTI

Type	Number	P value
Asymptomatic bacteriuria (ABU)	30	0.03
Symptomatic bacteriuria	55	

Asymptomatic bacteriuria (ABU) was seen in 30 and symptomatic bacteriuria in 55 subjects. The prevalence was found to be 65.3%. The difference was significant (P< 0.05) (Table II).

Table III Various pathogenic organisms isolated from patients

Bacteria isolates	ABU	Symptomatic bacteriuria	P value
Staph. aureus	35%	42%	0.91
E. coli	35%	30%	
Streptococcus Spp.	15%	22%	
Pseudomonas Spp.	10%	4%	
Acinetobactor Spp.	5%	2%	

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Bacteria isolates were; Staph. aureus was 35% and 42%, E. coli was 35% and 30%, Streptococcus Spp. was 15% and 22%, Pseudomonas Spp. was 10% and 4% and Acinetobactor Spp. was 5% and 2% in ABU and symptomatic bacteriuria patients respectively. The difference was significant (P< 0.05) (Table III).

DISCUSSION

Urinary tract infection in pregnancy is associated with significant morbidity for both mother and baby. The combination of mechanical, hormonal and physiologic changes during pregnancy contributes to significant changes in the urinary tract, which has a profound impact on the acquisition and natural history of bacteriuria during pregnancy. Those who have bacteria in the urine but no symptoms should not generally be treated with antibiotics.[7] This includes those who are old, those with spinal cord injuries, and those who have urinary catheters. Pregnancy is an exception and it is recommended that women take 7 days of antibiotics.[8] If not treated it causes up to 30% of mothers to develop pyelonephritis and increases risk of low birth weight and preterm birth.[9] Some also support treatment of those with diabetes mellitus and treatment before urinary tract procedures which will likely cause bleeding.[10] We performed this study to assess bacterial isolates in urinary tract infection among pregnant women.

Our results showed that age group 18- 21 years comprised of 60 subjects, 22- 25 years had 39, 26- 29 years had 25 and 30- 33 years had 6 subjects. Demilie et al[11] determined the bacterial profile and antibiotic resistance pattern of the urinary pathogens isolated from pregnant women. Out of 367 pregnant women, 37 were symptomatic and the rest 330 asymptomatic. Bacteriological screening of urine samples revealed growth of bacteria in 8.5% (7/37) and 18.9% (28/330) for symptomatic and asymptomatic pregnant women respectively with overall prevalence of 9.5%. The most common isolates detected were E. coli (45.7%) followed by Coagulase Negative Staphylococcus (17.1%) and S. aureus (8.6%). Gram-negative bacteria showed resistance rates in the range of 56.5% –82.6 % against trimethoprim/sulfamethoxazole, tetracycline, amoxicillin & ampicillin. Gram positive isolates showed resistant rate ranging from 50–100% against tetracycline, trimethoprim-sulphamethoxazole, amoxicillin and penicillin-G. Both Gram Positive and Gram- Negative bacteria showed high sensitivity against Nitrofurantoin with a rate of 82.3% and 87%, respectively. All isolated Gram positive bacterial uro-pathogens were sensitive for Amoxicillin-clauvlanic acid.

Our results showed that asymptomatic bacteriuria (ABU) was seen in 30 and symptomatic bacteriuria in 55 subjects. The prevalence found to be 65.3%. Hetal et al[12] in their study, a total of 501 pregnant women without symptoms of urinary tract infection were enrolled. Organisms were identified from midstream urine specimen and antibiotic susceptibility test was performed using bacteriological standard tests. Out of 501 pregnant women 60 (11.97%) were culture positive. Multiparous women had highest percentage of culture positivity of 26.92%. Staph. aureus was the predominant organism isolated and E. coli was 2nd most common organism isolated. There were also Pseudomonas Spp., Streptococcus Spp., Proteus mirabilis, Acinetobacter Spp., Enterococcus Spp., Klebsiella Spp., and Candida Spp.

Our results showed that bacteria isolates were; Staph. Aureus was 35% and 42%, E. coli was 35% and 30%, Streptococcus Spp. was 15% and 22%, Pseudomonas Spp. was 10% and 4% and Acinetobacter Spp. was 5% and 2% in ABU and symptomatic bacteriuria patients respectively. Taher et al[13] included 587 pregnant women with no symptoms and signs of urinary tract infection, were recruited. Out of the 587 pregnant women, 22 (3.75%) tested positive for asymptomatic bacteriuria. Women aged 20–24 years were less likely to have ABU when compared to women aged less than 20 years. The most common isolates in

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descending order were E. coli (n = 13, 46.4%) and S. aureus (n = 9, 32.1%). Among the gram- negative isolates, the highest sensitivity was to gentamycin (82.4%) and imipenem (82.4%). The gram- positive isolates were sensitive to gentamycin (90.9%) followed by imipenem (81.8%). All the isolates were resistant to trimethoprim-sulphamethoxazole (100%). Multidrug resistance was 82.4% among Gram Negative isolates and 72.4% among the Gram- Positive isolates.

CONCLUSION

Urinary tract infection is quite common in pregnancy. Common isolates seen are staph. aureus, E. coli, Streptococcus spp., Pseudomonas spp., Candida spp. and Acinobacter spp.

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