



Urinary tract infections and bacteriuria in pregnancy

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ABSTRACT

Background: To assess the urinary tract infections and bacteriuria in pregnancy.

Materials & methods: A total of 100 pregnant women were enrolled. All subjects were clinically identified to have no signs and symptoms of UTI. Clean midstream urine sample were collected from each patient into sterile universal container. The result was analysed using SPSS software. A P-value of < 0.05 was considered statistically significant.

Results: A total of 100 pregnant women were examined for asymptomatic bacteriuria. 42 were positive for significant bacteriuria, giving a prevalence of 42%. There was no significant difference with respect to trimester (P=0.20).

Conclusion: Asymptomatic bacteriuria is not uncommon among patients. As most of these cases present without any symptom, its early detection by screening for it with appropriate laboratory tests is vital. This would help clinicians to start appropriate antibiotic treatment at an early stage which in turn will help to minimize complications associated with UTI.

Keywords: Bacteriuria, Pregnancy, Infection.

Introduction

Urinary tract infections (UTI) remain a leading cause of morbidity and healthcare expenditure in all age groups.^{1,2} UTI account for about 10% of primary care consultations by pregnant women and it was reported that up to 15% of women will have one episode of UTI at some time during their life. The incidence of UTI reported among pregnant mothers is about 8%. Anatomically UTI can be classified into lower urinary tract infection involving the bladder and urethra and upper urinary tract infection involving the kidney and pelvis ureter. The majority of the UTI occur due to ascending infection.^{1,2} Organisms causing UTI in women (whether pregnant or not) are of the same species and virulence factors. Bacteria commonly isolated include *Escherichia coli*, *Klebsiella pneumonia*, *Proteus*, *Acinetobacter*, *Staphylococcus saprophyticus*, Group B *Streptococcus* (GBS), and *Pseudomonas aeruginosa*.³⁻⁵ Advanced maternal age, multiparity, sexual intercourse, diabetes, sickle cell anemia, previous history of UTI, immunodeficiency, and urinary tract abnormalities are risk factors for UTI in pregnancy.^{4,5} UTI in pregnancy is considered a risk factor for adverse maternal and

perinatal outcomes. Schieve et al. reported an increased association of UTI with premature labor, hypertensive disorders of pregnancy, anemia, and amnionitis.⁶

Asymptomatic bacteriuria refers to the presence of bacteria in urine. It is a condition in which urine culture reveals a significant growth of pathogens that is greater than 10^5 bacteria/ml, but without the patient showing symptoms of urinary tract infection (UTI).⁷ This is common during pregnancy. The apparent reduction in immunity of pregnant women appears to encourage the growth of both commensal and non-commensal microorganisms.⁸ The physiological increase in plasma volume during pregnancy decrease urine concentration and up to 70% pregnant women develop glucosuria, which encourages bacterial growth in the urine.^{9,10} Pregnancy enhances the progression from asymptomatic to symptomatic bacteriuria which could lead to pyelonephritis and adverse obstetric outcomes such as prematurity, low birth weight¹¹ and higher foetal mortality rates.^{1,12} The adverse effects of undiagnosed asymptomatic bacteriuria on mother and child have made researchers to suggest routine culture screening for all pregnant women attending antenatal clinic in order to prevent mother and child from any form of complication that may arise due to infection.¹³ Hence, this study was conducted to assess the urinary tract infections and bacteriuria in pregnancy.

Materials & methods

A total of 100 pregnant women were enrolled. All subjects were clinically identified to have no signs and symptoms of UTI. Clean midstream urine sample were collected from each patient into sterile universal container. The urine samples were examined microscopically and by cultural method. Identification of isolates was by standard microbiological technique. Laboratory investigations were done. Statistical analysis was performed by the chi-square test. The result was analysed using SPSS software. A P-value of < 0.05 was considered statistically significant.

Results

A total of 100 pregnant women were examined for asymptomatic bacteriuria. 42 were positive for significant bacteriuria, giving a prevalence of 42%. There was no significant difference with respect to trimester ($P=0.20$). The prevalence of uropathogens showed *Escherichia coli* as the most predominant organism. This was followed by *Staphylococcus aureus*.

Table 1: Prevalence rate with respect to trimester

Trimester	Number of patients	Number (%) infected
First	50	20 (40)
Second	30	14 (46.7)
Third	20	8 (40)
Total	100	42 (42)

Table 2: Prevalence of uropathogens

Organism	Number (%) prevalence
<i>Escherichia coli</i>	15 (25)
<i>Staphylococcus aureus</i>	13 (21.7)
<i>Klebsiella species</i>	10 (16.7)
<i>Proteus species</i>	8 (13.4)
<i>Candida albicans</i>	10 (16.7)
<i>Citrobacter species</i>	4 (6.7)

Discussion

Asymptomatic bacteriuria should be treated with antimicrobials even though the mother has no clinical symptoms. Various studies have proven that early treatment of asymptomatic bacteriuria in pregnancy reduces the incidence of acute pyelonephritis and decreases the incidence of pre-term delivery and low birth weight infants.^{1,14} Early recognition and treatment of asymptomatic bacteriuria can reduce up to 70% of acute symptomatic UTIs.¹⁵ Hence, this study was conducted to assess the urinary tract infections and bacteriuria in pregnancy.

In the present study, a total of 100 pregnant women were examined for asymptomatic bacteriuria. 42 were positive for significant bacteriuria, giving a prevalence of 42%. There was no significant difference with respect to trimester ($P=0.20$). A study by Imade PE et al, studied a total of 556 (45.3%) were positive for significant bacteriuria. There was a significant difference in the prevalence of asymptomatic bacteriuria with respect to age ($P < 0.0001$). Trimester did not show any significant difference ($P = 0.2006$) in the prevalence of asymptomatic bacteriuria. *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. Asymptomatic bacteriuria is not uncommon among antenatal patients in the population studied. Routine urine cultural test should be carried out on all antenatal patients in order to identify any unsuspecting infection. This measure will go a long way in reducing maternal and obstetric complications associated with pregnancy.¹⁶

In the present study, the prevalence of uropathogens showed *Escherichia coli* as the most predominant organism. This was followed by *Staphylococcus aureus*. Another study by Glaser AP et al, bacteriuria during pregnancy may be classified as asymptomatic bacteriuria, infections of the lower urinary tract (cystitis), or infections of the upper urinary tract (pyelonephritis). Lower tract bacteriuria is associated with an increased risk of developing pyelonephritis in pregnancy, which is itself associated with adverse maternal and fetal outcomes. Pregnant women should be screened for the presence of bacteriuria early in pregnancy. All bacteriuria in pregnancy should be treated, and antimicrobial choice in pregnancy should reflect safety for both the mother and the fetus. After treatment of bacteriuria, patients should be followed closely due to risk of recurrent bacteriuria.¹⁷ Balachandran L et al, studied women who had a UTI during pregnancy had more preterm deliveries than those without a UTI ($c2=7.092$; $p=0.007$). Recurrent UTI was observed in 26.6% of women with UTI, while the incidence of pyelonephritis was relatively low in this group (1.45%). There was no significant association between LBW and UTI in pregnancy ($c2=0.097$; $p=0.756$). The most common bacteria isolated from women with UTI were Group B *Streptococcus* (GBS, 31.3%), followed by *Escherichia coli* (30.9%). They were sensitive to a wide range of antibiotics. Significant predictors of bacteriuria in pregnancy history include UTI, renal calculi, and nulliparity. Women with UTI in pregnancy are more likely to have preterm delivery. However, adequate management can minimize other complications like pyelonephritis and adverse perinatal outcomes.¹⁸ Asymptomatic bacteriuria is defined as a finding of more than 10^5 colony-forming units per mL of urine in a clinically asymptomatic person.¹ This condition may be present even before the mother gets pregnant. There are reports that 1.2 to 5 % of young girls will demonstrate asymptomatic bacteriuria at some time before puberty.^{15,19} The prevalence of asymptomatic bacteriuria in pregnancy is about 10%. Lower serum interleukin-6 levels and serum antibody responses to *E. coli* antigens which occurs in pregnancy has been associated with increased incidence of asymptomatic bacteriuria in pregnancy.¹⁹ Neonatal complications which are associated with asymptomatic bacteriuria include intrauterine growth restriction, low birth weight and pre-term premature rupture of membrane.^{15,19,20}

Conclusion

Asymptomatic bacteriuria is not uncommon among patients. As most of these cases present without any symptom, its early detection by screening for it with appropriate laboratory tests is vital. This would help clinicians to start appropriate antibiotic treatment at an early stage which in turn will help to minimize complications associated with UTI.

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