



Original Research Article

Prevalence of asymptomatic urinary tract infections in pregnancy in rural area

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ABSTRACT

Asymptomatic bacteriuria (ASB) may be defined as the "presence of actively multiplying bacteria within the urinary tract excluding the distal urethra", at a time when the patient has no urinary tract symptoms. Pregnant women with ASB are more likely to develop acute pyelonephritis in later pregnancy, hypertensive disease of pregnancy, anemia, chronic renal failure, prematurity, low birth weight babies and prenatal death. The present study was designed to identify the prevalence of ASB in pregnancy, spectrum of the isolates and their antimicrobial susceptibility pattern. The urine samples collected after aseptic precautions were sent to Microbiology Deptt. within 30 minutes of collection. Specimens were cultured onto the Cysteine Lactose Electrolyte Deficient agar (CLED), MacConkey agar and blood agar. The significant bacterial isolates were identified by standard procedures and subjected to antibiotic susceptibility by Kirby Bauer's disc diffusion method. The prevalence of ASB was found to be 6.29%. Among the etiological agents *Escherichia coli* (47.05%) was the most predominant isolate. An early detection and treatment of ASB may be of considerable importance not only to forestall complications in the mother, but also to reduce prematurity and fetal mortality in the offspring.

Keywords

Asymptomatic; bacteriuria; pyelonephritis; Pregnancy

Introduction

Asymptomatic (ASB) bacteriuria is now a well recognized entity in the spectrum of urinary tract infections (UTIs). It is defined as a significant bacterial count $>10^5$ organisms or colony forming units (CFU/ml) in the urine of a person in the absence of symptoms (Mohammad M, et al, 2003). ASB during pregnancy is a major predisposition to the development of

symptomatic UTI. It is present in 2-10% of pregnant women (Etherington J et al 1993, Millar L et al 2000). ASB may exist for short term in non pregnant women but rarely resolves spontaneously during pregnancy. It has been suggested that the frequency of bacteriuria increases by about 1% during pregnancy (Nicolle E 2003). Pregnancy gives rise to several anatomical

& physiological changes, which make them more susceptible to develop UTI. Furthermore, immunosuppression and progesterone effects of progesterone on smooth muscle in third trimester leads to stasis of urine, thereby encouraging bacteriuria. ASB during pregnancy increases the risk of development of acute pyelonephritis by 25% and may result in complications such as preterm labour, prematurity, perinatal mortality, transient renal failure, acute respiratory distress syndrome, sepsis and shock (Mohammad M, et al, 2003, Stein G et al 2000, Gilstrap LC et al 2001) .

The significant consequences of ASB for women and pregnancy, which can be overcome by treatment, justify the screening of ASB in pregnancy. Moreover, the frequency of uropathogens and their antimicrobial resistance patterns also vary in different geographical regions. Because of the paucity of the data regarding the prevalence of ASB in this area, the present study was designed to identify the prevalence of ASB, spectrum of isolates and their antimicrobial susceptibility pattern.

Materials and Methods

This prospective study was carried out in the antenatal clinic in the Department of Microbiology and Obstetrics & Gynaecology at BPS, GMC for women, Khanpur Kalan, Sonapat from May 2013 to October 2013. Those with any symptoms of UTI, any renal pathology, chronic renal diseases, intake of antibiotics during proceeding 2 weeks and any active genital bleeding were excluded from the study. Patient were advised to collect midstream urine specimens in universal sterile containers after thorough washing of the genital area. The samples were then

sent to Microbiology Deptt. within 30 minutes of collection. Specimens were cultured onto the Cysteine Lactose Electrolyte Deficient agar (CLED), MacConkey agar and blood agar. The plates were incubated at 37°C for 24 hrs. The isolates were identified by standard microbiological procedures (Collee JG et al, 1996). The urine culture was defined as positive if colony count (CFU) >10⁵ per ml of urine, regardless of the presence or absence of leucocytes. Antimicrobial sensitivity testing was done by disc diffusion method as per CLSI guidelines (CLSI).

Results and Discussion

A total of 540 pregnant women, ages ranged from 18 to 41 years, were examined for asymptomatic bacteriuria. Out of these 34 had significant bacteriuria, giving a prevalence of 6.29%. The highest incidence of bacteriuria was observed in third trimester.

Among the etiological agents *Escherichia coli* (47.05%) was the most predominant isolate (Table 1). The isolated bacterial species from all samples were screened with different appropriate antibiotics. Gentamicin was the most effective of all the drugs (100%), followed by nitrofurantoin (87.5%) and ceftriaxone (75%) (Table.2).

Among the Gram positive isolates, Coagulase Negative Staphylococci (CONS) were most frequently grown in cultures. The resistance was highest for ampicillin (21.42%) & amoxyclav (28.57%) (Table 3). All the strains were sensitive to vancomycin & linezolid, however, organisms also responded well to nitrofurantoin.

The prevalence of asymptomatic bacteriuria in pregnant women in our

Table.1 Distribution of isolates

| Species | No. of isolates | % |
|------------------------------|-----------------|-------|
| <i>Escherichia coli</i> | 16 | 47.05 |
| <i>Klebsiella</i> spp. | 2 | 5.88 |
| <i>Citrobacter</i> spp. | 2 | 5.88 |
| <i>Staphylococcus aureus</i> | 5 | 14.7 |
| CONS | 9 | 26.47 |
| <i>Candida</i> spp. | 2 | |

CONS : Coagulase Negative Staphylococcus

Table.2 Antimicrobial susceptibility of Gram negative organisms (%)

| Bacteria | Amp | Amc. | Cip | Cot | Nx | Nft | Cefo. | G |
|----------------------------------|-------|-------|-------|-------|-------|-------|-------|-----|
| <i>E. coli</i> (n=16) | 31.25 | 68.75 | 31.25 | 37.50 | 31.25 | 87.50 | 75.0 | 100 |
| <i>Klebsiella</i> spp. (n=2) | 100 | 100 | 100 | 0 | 100 | 100 | 100 | 100 |
| <i>Citrobacter</i> spp. (n=2) | 0 | 0 | 0 | 50 | 0 | 100 | 100 | 100 |
| Total | 35 | 65 | 35 | 35 | 35 | 90 | 80 | 100 |

Amp-ampicillin, Amc-amoxyclav, Cip-ciprofloxacin, Nx-norfloxacin, Nft-nitrofurantoin, Ce-cefotaxime, G-gentamicin, Cot-cotrimoxazole

Table.3 Antimicrobial susceptibility of Gram positive organisms(%)

| Bacteria | Amp | Amc | Cip | Cot | Nx | Nft | Va | Lz |
|--------------------------|-------|-------|-------|-------|-------|-------|-----|-----|
| CONS (n=9) | 22.22 | 33.33 | 66.66 | 77.77 | 77.77 | 100 | 100 | 100 |
| <i>S.aureus</i> (n=5) | 20 | 20 | 40 | 40 | 40 | 80 | 100 | 100 |
| Total (n=14) | 21.42 | 28.57 | 57.14 | 64.28 | 64.28 | 92.85 | 100 | 100 |

Amp-ampicillin, Amc-amoxyclav, Cip-ciprofloxacin, Nx-norfloxacin, Nft-nitrofurantoin, Va-vancomycin, Lz-linezolid, Cot-cotrimoxazole

study was 6.29% which is comparable with the study by Khattak et al,(2006) & Celen et al,(2011). Pregnant women with ASB are more likely to deliver premature or low birth weight infants and have a 20-30 fold increased risk of developing pyelonephritis compared to women without bacteriuria (Smaill F,2007). In the present study, most of the isolates were obtained in the third trimester. This may be due to the effect of pressure of bigger uterus size and hormonal smooth muscle relaxation leading to stasis of urine.

The etiology of UTI has been regarded as well established and reasonably consistent. In our study, *E.coli* was the most frequent uropathogen, which is in concordance with studies in other parts of the world (Mohammad M,et al 2003, Khattak et al 2006, Celen et al 2011,Hazhir S 2007).

The second most common urine isolate was Coagulase negative Staphylococci (CoNS) in our study. Gram positive organisms, are new increasingly being recognized as important cause of UTI. Similar findings has also been suggested by Khattak et al (2006) & Abdullah et al (2005). Majority of the strains were found sensitive to gentamicin (100%), nitrofurantoin (90%) followed by cefotaxime (80%). Ampicillin was the least effective agent (35.0%).

Nitrofurantoin was found to be the most effective antibiotic for both Gram positive (90%) and Gram negative organisms (92.85%). Its safety in pregnancy and bioavailability in urine makes it a good choice. Jamie and coauthors (2002) also suggested nitrofurantoin as the preferred agent for empiric therapy of lower UTI in pregnant women Similar results were also observed by Kader and coauthors (2004) and Deshpande et al (2011).Commonly

prescribed fluoroquinolones were found to be less effective for treatment of UTI in the present study .

The treatment of ASB reduces the rate of subsequent symptomatic UTI by 80-90% and approx a 75% reduction in the incidence of pyelonephritis (Connolly A et al 1999).Therefore,our study suggests that regardless of the incidence of asymptomatic bacteriuria in pregnancy, urine screening should be recommended for each and every patient during their first antenatal visit and routinely repeated thereafter in each trimester.

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