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Prevalence of Asymptomatic Bacteriuria during Second Trimester of Pregnancy With Respect To Parity

Lakshmipriya R, Raveendran SR, Chitralekha S, and Menezes GA*

Assistant Professor & Scientist,Microbiology & Central Research Laboratory (CRL), Sree Balaji Medical College & Hospital ,Chromepet, Chennai, India (Bharath University)

ABSTRACT

Asymptomatic bacteriuria (ASB) during pregnancy is known to cause serious effects on the outcome of pregnancy. This study was done to know the association between parity and prevalence of asymptomatic bacteriuria during second trimester pregnancy. This is a cross sectional study done between July 2011 and July 2012. The sample size was 125 subjects. Clean catch midstream urine (CCMSU) was obtained after getting informed consent from the individuals. The samples were processed in central microbiology laboratory using standard microbiological methods. Of 125 pregnant women screened for asymptomatic bacteriuria, 58 (46.4%) subjects were primigravida, 59 (47.2%) subjects were secundigravida and 8 (6.4%) were tertigravida. The study showed asymptomatic bacteriuria among 5.17%; 15.25%; and 25% in the primigravida; secundigravida; and tertigravida respectively. The study reemphasizes an increased frequency of asymptomatic bacteriuria with increasing parity.

Keywords: asymptomatic bacteriuria, pregnancy, parity, second trimester

***Corresponding author**:

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INTRODUCTION

Urinary tract infection (UTI) is the commonest infection that affects humans next to respiratory and gastrointestinal infection. During pregnancy the chances of acquiring UTI increases, this may be due to various reason like morphological and physiological changes that occur during pregnancy[1]. UTI can be defined as the extension of microbial invasion anywhere between renal cortex of the kidney to the urethral meatus. UTI may present with various symptoms like increase in frequency of micturation, painful micturation, suprapubic pain, loin pain and fever[2].

UTI may be divided into symptomatic and asymptomatic bacteriuria. Furthermore symptomatic UTI may be divided into lower urinary tract infection causing mucosal invasion of the urinary bladder and UTI causing inflammation of the parenchyma of renal calyx and pelvis[3].

Kass in 1956 defined asymptomatic bacteriuria (ASB) as "a condition characterized by the absence of symptoms of acute UTI at a time when true bacteriuria exists. Quantitative estimation should show 100,000 or more bacterial/ml of urine, from freshly voided, aseptically collected MSU[4]".

Globally the prevalence of ASB varies from 2% to 10% during pregnancy[6]. The incidence of UTI increases with age and parity. This is due to the laxity of the pelvic tissues with advancing age that helps in easy access of the microbial invasion to the urethra. From there it ascends up to the bladder and upper urinary tract. Multiparous women would have had manipulations to the urinary tract with the catheters during previous deliveries which may lead to bacteriuria[7].

ASB is more serious problem compared to symptomatic bacteriuria because diagnosis of ASB is difficult and is more common during pregnancy. Screening for ASB is important during pregnancy. Although there are several methods of screening tests available, none of them replace urine culture for detecting UTI. The chances of progression from asymptomatic bacteriuria to symptomatic bacteriuria is more during pregnancy which may lead to complications like acute pyelonephritis, low birth weight infants, preterm labor[8].

Majority of the studies show *Escherichia coli* as the most common organism causing UTI. *Klebsiella* spp., *Proteus* spp., *Staphylococcus aureus*, *Enterococcus* spp., Coagulase negative *Staphylococccus* (CoNS), and *Pseudomonas aeruginosa* also are responsible for causing UTI in different proportions[1,6,7,10].

Against this background, this study was done to know the association between prevalence of asymptomatic bacteriuria with increase in parity during 2nd trimester of

pregnancy among individuals attending antenatal clinic at a tertiary care hospital in Chennai, India.

MATERIALS AND METHODS

The study populations included pregnant women attending antenatal clinic during July 2011 to July 2012, in the Department of Obstetrics and Gynecology (OBG) of our hospital.
This is a cross sectional study and the inclusion criteria considered were, pregnant women in the 2nd trimester of pregnancy (12 weeks to 28 weeks of gestation); subjects without UTI symptoms; subject without fever; and subjects aged in between 18-35 years. The exclusion criteria considered were non pregnant women; pregnant women in 1st and 3rd trimester of pregnancy; subjects on antibiotic coverage for any other illness; subjects with any systemic illness; and subjects aged below 18 years and above 35 years.

All the pregnant women included in the study population were clearly explained about the purpose and nature of the study. CCMSU samples were collected after obtaining written informed consent from them.

History was obtained from them including UTI symptoms, history of recent antibiotic intake, past history of UTI, history of systemic illness, obstetric history and any previous surgical history or interventional history like catheterization.

Sample collection[8,10,11]

The subjects were given proper instructions to collect CCMSU sample following proper periurethral and perineal toileting with soap and water. The urine sample was collected in a sterile universal container. The sample collected likewise was transported to the Central Microbiology Laboratory immediately.

The samples were processed immediately in the laboratory. Macroscopic and microscopic examination was carried out. Uncentrifuged urine was inoculated on to Nutrient agar and Cysteine lactose electrolyte deficient (CLED) agar by standard loop technique, semi quantitative method on MacConkey agar.

Plating of urine sample

A semi-quantitative method was adopted for the primary isolation of the organisms and the culture plates were incubated at 37^{o}c in incubator for 24 hours aerobically.
In positive cultures the colony counting was carried out by using hand lens and the number of colonies was multiplied by 250 to determine the number of microorganisms per milliliter in the specimen. Urine with a colony forming unit (CFU) of 10^5 per ml were considered as significant bacteriuria[10,11,12,13].

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Interpretation of results[14]

Kass in 1956 had formulated a criterion for active bacterial infection of the urinary tract. They are the following a) Significant bacteriuria: colony count more than 10^5 bacteria of single species per ml is indicative of active UTI; b) Doubtful significance: colony count between 10^4 to 10^5 per ml of urine is of doubtful significance and specimen should be repeated for culture; and c) No significant growth, where the colony count less than 10^4 is regarded as contaminant. Contamination is considered when three or more types of bacteria are isolated.

In case of no growth in the culture media after 24 hours it was further incubated for 24 hours and checked for any growth on the next day. In case of no growth after 48 hours of incubation it was reported as 'no growth'[8,13].

The urine sample was cultured onto nutrient agar, MacConkey agar, and CLED agar. The isolates obtained were identified by standard biochemical tests. The antibiotics tested for Gram positive isolates were penicillin (10µg), amoxicillin (10µg), amoxicillin-clavulanic acid, co-trimoxazole (25µg), cephalexin (30µg), cefazolin (30µg), cefuroxime (30µg), erythromycin (15µg), chloramphenicol (30µg), ciprofloxacin (5µg), ofloxacin (5µg), piperacillin (100µg), azithromycin (15µg), and tetracycline (30µg). Whereas, for Gram negative isolates the antibiotics tested were norfloxacin (10µg), aztreonam (30µg), cefotaxime (30µg), nalidixic acid (20), nitrofurantoin (300µg), cefuroxime (30µg), gentamicin (10µg), amikacin (30µg), ciprofloxacin (5µg), ofloxacin (5µg), ceftazidime (30µg), ceftriaxone (30µg), cefixime (5µg), and cefdinir (5µg). Antibiotic susceptibility testing was carried out by Kirby-Bauer disc diffusion method.

RESULTS

A total of 125 subjects were included in the study population who belong to the second trimester of pregnancy, attending antenatal clinic in our hospital. Routine urine analysis was performed to look for presence of pus cells and bacteria. Urine culture and antimicrobial susceptibility testing was done for all the samples.

Fourteen pregnant women (11.2%) out of 125 samples had significant bacteriuria (> 100,000 or more bacteria/ ml of urine). The parity distribution in the study and prevalence of ASB in relation to parity are given in the table 1 and table 2 respectively.

Table 1: Parity distribution in the study

Sl. No.	Gravida	Number of samples	Percentage %
1	Primigravida	58	46.4
2	Secundigravida	59	47.2
3	Tertigravida	8	6.4

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Table 2: Prevalence of asymptomatic bacteriuria (ASB) with respect to parity

Sl. No.	Gravida	Number of samples	Number of isolates	Prevalence Percentage %
1	Primigravida	58	3	5.17
2	Secundigravida	59	9	15.25
3	Tertigravida	8	2	25

DISCUSSION

It has been known for a long time that there is an association between asymptomatic bacteriuria during pregnancy and increase in risk of obtaining overt UTI. The present cross sectional study was conducted to know the increase in prevalence of ASB in relation to increase in parity in our antenatal population of SBMCH, Chennai, India.

Globally the prevalence of ASB among pregnant women were found to be between 2% to 10%[6,7,9,15,16]. In our study the prevalence of ASB during second trimester of pregnancy is 11.2%. The commonest organism isolated in this study was *Escherichia coli* (35.7%), which correlates with other studies[5] and shows 88% of organism to be *E. coli* [1,6].
In this study the prevalence of ASB among primigravida was 5.17%, secundigravida was 15.25% and tertigravida was 25%. This shows there is a definite association between prevalence of ASB with increase in parity. Similar results have been obtained in a study conducted by Girishbabu *et al* in 2011[17], Fatima N *et al* 2006[18].

The reason behind increase in prevalence of ASB in multiparous women in comparison with primigravida may be due to the face that there would have been manipulations in the urinary tract by catheterization during earlier pregnancies. This is an important risk factor for microbial invasion in the urinary tract.

If ASB is left untreated it may lead to complications like low birth weight, preterm labour, acute pyelonephritis, and anemia. Hence all pregnant women must be screened for ASB as early as their first visit to the antenatal checkup itself[16,19].

When the cultures are found to be positive it is mandatory to treat the pregnant women with proper antibiotics to minimize the complications of ASB to the mother and also to the child. A repeat urine culture must be obtained during third trimester of pregnancy to know the prognosis and if there is any recurrent bacteriuria[20].

CONCLUSION

To conclude, 125 subjects were screened for asymptomatic bacteriuria in this study. Out of which 11.2% were found to have ASB, which correlates with the worldwide prevalence of ASB during pregnancy. The study mainly highlighted the association between parity and prevalence of ASB during second trimester of pregnancy It also shows that there was increase

in prevalence of ASB during pregnancy with increase in parity which is evident from the study that prevalence rates of ASB among primigravida is 5.17% and secundigravida is 15.25% and tertigravida is 25%. Therefore it is mandatory to screen all antenatal women for ASB and give proper treatment, when culture is found positive.

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