

Prevalance of Pregnancy Associated Asymptomatic Bacteriuria: A Study Done in a Tertiary Care Hospital

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Abstract

Objectives A prospective study was conducted in the Department of microbiology (IGMC) and the Department of obstetrics & gynecology (KNH), Shimla, and Himachal Pradesh over a period of 1 year from May 2005 to April 2006 on 463 asymptomatic pregnant females with a period of gestation (POG) 28 weeks or less. The aim was to find out the prevalence of pregnancy associated bacteriuria and bacterial causes responsible for this entity.

Methods The pregnant women were taught to collect the urine sample by aseptic technique which was then subjected to semi quantitative culture method.

Results Significant bacteriuria was present in 7.34% cases. About 78% samples were found to be sterile.

Insignificant count and growth of contaminants was positive in 1 and 13% samples, respectively. The most common etiological agent came out to be *E. coli* followed by other gram positive and gram negative organisms.

Conclusion Asymptomatic bacteriuria is a common occurrence which should be diagnosed and treated in early pregnancy keeping in view its adverse effects on pregnancy.

Keywords Asymptomatic bacteriuria · POG · Significant bacteriuria

Introduction

Urinary tract infections (UTIs) are one of the commonest of all infections. Asymptomatic bacteriuria is one of the clinical manifestations of UTI. It is defined as persistently and actively multiplying bacteria in significant numbers i.e., 10^5 bacteria per milliliter (ml) with in the urinary tract without any obvious symptoms [1]. It is also known as Covert bacteriuria. The term asymptomatic bacteriuria of pregnancy refers to the presence of a positive urine culture in an asymptomatic pregnant female. Females are more susceptible for these infections because of short urethra. The pregnant females are two times more commonly affected than age matched non pregnant females [2]. The reason behind is urinary stasis due to progesterone effect in pregnancy in addition to different anatomical changes occurring during pregnancy. Various studies from the west

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have documented the prevalence of asymptomatic bacteriuria in pregnancy to be between 2 and 7% while in India it was found to be on higher side i.e., between 5 and 12%[3]. Commonest organisms responsible are *Escherichia coli* (80–85%), followed by coagulase negative *Staphylococcus spp.*, *Klebsiella spp.*, *Pseudomonas spp.*, and *Proteus spp.*

The Gold standard investigation for detection of asymptomatic bacteriuria is urine culture. Therefore, urine culture at first prenatal visit or between 12 and 16 weeks of gestation should be considered as a screening test of choice. Detection of asymptomatic bacteriuria during pregnancy is important as subsequently it may lead to symptomatic infection during that pregnancy in 25% of infected women, chronic infection resistant to chemotherapy and various pregnancy associated complications like low birth weight (LBW) babies, preterm etc [1]. Hence this is a treatable entity.

We conducted the present prospective study in our hospital as no such type of study was conducted previously in our region.

Materials and Methods

The study was conducted over a period of 1 year on a total of 463 asymptomatic pregnant females at their first visit in first or second trimester of pregnancy. Informed consent was taken and the pregnant females were counseled regarding the method of collection of clean catch mid stream urine sample. The samples were immediately transferred and processed within 1–2 h of collection in the laboratory. They were subjected to semiquantitative culture method. The culture was done by surface streaking method on 5% sheep Blood agar and Mac-Conkey agar. For this sterile standard nichrome loop of 28 SWG was used, which had internal diameter 3.26 mm and volume holding capacity of 0.004 ml. The plates were incubated at 37°C for 24 h. Prolonged incubation was done for further 24 h if no growth obtained. The identification of isolates was done by gram staining, motility test, catalase test, coagulase test, oxidase test and routine biochemical tests as per Cowan and Steels manual [4]. The growth was interpreted as sterile if no growth obtained. It was reported as significant if the growth obtained was confluent or the number of colonies corresponded to 10⁵ colony forming units (CFU) per ml i.e., 400 colonies or more. Insignificant growth was reported if colony count obtained corresponded to less than 10⁵ CFUs per ml of urine except in case of growth of *Staphylococcus aureus* where even 10² CFUs per ml were taken as significant.

The antibiotic sensitivity testing was done by Kirby Bauer disc diffusion method on Muller Hinton agar plate as

per recommendation of NCCLS (CLSI) [5]. Standardization of antibiotic susceptibility testing was done by using standard strains of *E. coli* ATCC 25922 and *S. aureus* ATCC 25923 as control strains. All the asymptomatic bacteriuric pregnant females were advised to take treatment.

Results

Out of 463 asymptomatic pregnant females screened, seventy-eight percent of the samples came out to be sterile. Significant bacteriuria was found in 34 (7.34%) cases and 6 (1.3%) of samples were reported as having insignificant growth by semiquantitative culture method. Growth of contaminants was shown by 62 (13.4%) samples (Table 1). Out of positive culture results, 52.9% were primigravida and 47.1% were multigravida. In age wise distribution, the incidence reported was 91.2, 8.82 and 0%, respectively in age groups 21–30, 31–40 and <20 years. As per trimester of pregnancy incidence came out to be 10.8% in first trimester and 6.25% in second trimester. The commonest isolate detected in culture was *E. coli*, which alone responsible for 79.5% cases, followed by *S. aureus* in 8.8%, Coagulase negative *Staphylococcus spp.* in 5.9%, *K. pneumoniae* in 2.9%, and *P. mirabilis* in 2.9% of the culture isolates (Table 2).

Three isolates i.e., 8.82% isolates were found to be resistant to all the first line antimicrobial drugs included Ampicillin, Nalidixic acid, Cotrimoxazole, Norfloxacin, Netilmicin and Cefoperazone. Out of these three isolates two were *E. coli* and one was *K. pneumoniae*. On putting

Table 1 Results of culture

Results of culture	Number of cases	Percentage (%)
Significant bacteriuria	34	7.3
Insignificant bacteriuria	6	1.3
Contamination	62	13.4
Sterile	361	78.0
Total	463	100

Table 2 Distribution of bacterial isolates

Name of isolate	Number of cases	Percentage (%)
1. <i>E. coli</i>	27	79.5
2. <i>S. aureus</i>	3	8.8
3. CONS	2	5.9
4. <i>K. pneumoniae</i>	1	2.9
5. <i>P. mirabilis</i>	1	2.9
Total	34	100

sensitivity testing to second line drugs *K. pneumoniae* was found to be sensitive to Cefuroxime and *E. coli* isolates showed sensitivity to Cefuroxime, Ceftazidime and Ceftriaxone.

Discussion

The Urinary tract—so called “the Problem tract” is second to respiratory tract in acquiring microbial infections especially in females and that to in pregnancy. Asymptomatic bacteriuria of pregnancy needs special considerations because of lack of symptoms and harmful consequences in pregnancy. All the pregnant females should be recommended to get screened for asymptomatic bacteriuria in their early pregnancy. The urine culture should be the method of choice for screening. Subsequently asymptomatic bacteriuria should be treated as per antimicrobial sensitivity pattern of the isolate to prevent maternal and perinatal morbidity.

The pioneer in reporting incidence of asymptomatic bacteriuria was Kass, who reported it to be 6–7% [6]. Overall the incidence in various Indian studies was found to be between 5 and 12% and in western studies the incidence ranges from 2 to 7% [3]. In the present study the incidence of asymptomatic bacteriuria came out to be 7.34% which is concordant with many foreign and Indian studies. In the present study the percentage of positive cases in age groups 31–40, 21–30 and <2.0 years came out to be 6.98, 7.43 and 0%, respectively. Roy et al. found the incidence to be 15.9, 11.7 and 11.6%, respectively in these age groups [7]. In a study by Lavnya et al. and Bhagwan et al. showed very high incidence of asymptomatic bacteriuria in women <20 years of age [8, 9]. In our study 0% incidence can not be commented upon as only three patients of this age group were present in study group. The higher incidence to some extent in primigravida showed positive correlation with the studies by Nath et al. and Lavnya et al. [2, 8]. But study by Roy et al. depicted the incidence to be higher in multigravida [7]. The higher incidence in primigravida can be explained by the fact that physiological and anatomical changes are more marked in primigravida. Higher rates of infection detection in first trimester of pregnancy is in similarity to the study of Yashodhara et al. [3]. Although, in studies of Nath et al. and Roy et al. it was found to be more in second trimester [2, 7]. The higher incidence in first trimester could be because of hormonal changes occurring prior to anatomical changes. Moreover, earliest study by Kass explains that there is rare acquisition of bacteriuria after the second month of pregnancy [6]. The bacteria responsible for asymptomatic bacteriuria are of fecal origin which colonize the periurethral area. The gram negative bacteria are the main culprit. In the analysis of different studies [8–12], *E. coli*

was found to be the commonest isolate, as was found in our study. Multidrug resistance was detected in 8.82% of the isolates, which were further tested for the second line drugs and were found to be 100% sensitive for them.

All the patients with significant bacteriuria were advised to take treatment as per culture and sensitivity report. No further follow-up or study was carried out to find out the rate of various complications. But as per review of literature, toxemia of pregnancy was found to be in 12.9% of bacteriurics in a study conducted by SK Roy et al. [7]. Similarly P Mitra et al. [10] showed that pre eclamptic toxemia was more common in the bacteriuric group (9.1%) as compared to abacteriuric group (6%) and also incidence of prematurity higher (18.2%) as compared to abacteriurics (8.3%). Significantly higher rates of LBW babies was observed with UTI (22.4%), in comparison to those without UTI (7.7%), in a study conducted by G Nath et al. [2]. In a similar pattern, incidence of prematurity and LBW babies were observed to be 75 and 50%, respectively in untreated patients, in a study by SV Lavanya et al. [8].

Further according to study by World bank/World health organization (WHO) for global burden of disease, LBW and perinatal causes are leading causes of death and disability. To counter the high rates and disproportionate world burden of neonatal morbidity and mortality, WHO developed, MOTHER BABY PACKAGE as a universal mechanism for safe motherhood initiative [13]. This initiative can drastically reduce financial burden as it is seen that, screening and treatment of asymptomatic bacteriuria costs about US \$2.20 but managing complications like pre term and IUGR costs about US \$40–46 per case [14]. Therefore, it is better to screen and treat the pregnant females with asymptomatic bacteriuria to avoid complications linked to it as it is rightly said that prevention is always better than cure.

Conclusion

Pregnancy associated bacteriuria is a common entity. The common pathogens involved are of fecal origin. Because of complications associated with asymptomatic bacteriuria in pregnancy, it should be made mandatory to screen every antenatal women in early pregnancy for it. Urine culture is the ideal method for diagnosis. Treatment with appropriate antibiotic therapy should be done in every positive case.

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