

Prevalence of Asymptomatic Bacteriuria among Pregnant women in a tertiary care hospital

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Abstract- Urinary tract infections (UTIs) are the most common bacterial infections during pregnancy. Asymptomatic bacteriuria (ASB) is a major risk factor for the development of urinary tract infections during pregnancy, and with further risk of preterm birth & pyelonephritis if untreated. So, this study was carried out to determine the prevalence of Asymptomatic bacteriuria (ASB) in pregnant women & to isolate, identify the causative organisms; and to test the antimicrobial susceptibility of isolated pathogens.

A total of 300 pregnant women were studied over a period of six months at I.P.G.M.E.R & S.S.K.M hospital, Kolkata, a tertiary health care centre. Clean catch midstream urine sample was collected into a sterile container & then subjected to culture method. Out of 300 patients studied, Significant bacteriuria was noted in 33 patients (11%). 4% patients had insignificant bacteriuria. E.Coli was the most common etiological agent(72%), followed by Staphylococcus aureus.

Asymptomatic bacteriuria is not uncommon in antenatal patients. All pregnant women should be screened by urine culture to detect asymptomatic bacteriuria at their first visit to prevent overt UTI & other complications in both mother & fetus.

Index Terms- Antenatal women, Asymptomatic bacteriuria, Urine culture, UTI.

I. INTRODUCTION

Asymptomatic bacteriuria is common in women and increases in prevalence with age and/or sexual activity, due to short urethra, pregnancy, and easy contamination of urinary tract with fecal flora[1,3].

It may be of two types, symptomatic or asymptomatic. Asymptomatic bacteriuria (ASB) is defined as persistently & actively multiplying bacteria in significant numbers i.e., 10^5 bacteria per milliliter(ml) within the urinary tract without any obvious symptoms [2,6,7]. The pregnant women are two times more commonly affected than age matched non pregnant females[11,12]. This is due to urinary stasis due to progesterone effect in pregnancy in addition to different morphological & physiological changes occurring during pregnancy. Prevalence of asymptomatic bacteriuria(ASB) among pregnant women, as has been quoted in the western literature, varies from 2 to 10% [3,9]. Fewer studies on this topic are available on the Indian scenario and the reported prevalence rate is as high as 8% [4,5,8.]. Detection of ASB in antenatal women is important, as, undetected and untreated ASB may lead to symptomatic infection during that pregnancy in 25% of culture positive

patients, acute pyelonephritis, hypertension in pregnant women, postpartum UTI, anaemia, preterm labour, low birth weight & perinatal death of the fetus [2,3,10].

The relatively high prevalence of asymptomatic bacteriuria during pregnancy and its significant consequences on women and on their pregnancies, plus the ability to avoid the sequelae with treatment, justify the screening of pregnant women for bacteriuria [4,5].

Urine culture is the gold standard screening technique for ASB during pregnancy[13,14,15]. The most common infecting organism is Escherichia Coli, which is responsible for 75-90% of bacteriuria during pregnancy. 25-30% of the asymptomatic bacteriuria cases develop into acute symptomatic UTI. Hence, early detection and treatment is of considerable importance not only to prevent acute pyelonephritis & chronic renal failure in the mother, but also to reduce prematurity & fetal mortality[1,13].

II. MATERIALS & METHODS

This prospective study was undertaken in 300 antenatal women, irrespective of their period of pregnancy, attending Obstetric & Gynecology OPD and Nephrology OPD, and those admitted in wards at I.P.G.M.E.R & S.S.K.M Hospital, Kolkata, over a period of six months from January 2011 to July 2011. Urine culture was performed in Microbiology laboratory. The study & data collection were carried out with the approval from the Institutional Ethical Committee.

Exclusion criteria:

- 1) Symptoms suggestive of infections in urinary tract (dysuria, frequency & urgency)
- 2) History of antibiotic therapy in previous two weeks
- 3) Known congenital anomalies of urinary tract.
- 4) History of fever
- 5) Pregnancy induced hypertension; &
- 6) Pregnancy with Diabetes Mellitus.

Informed consent was taken & antenatal women were counselled regarding the collection of "clean catch" mid stream urine sample in a sterile, wide mouthed container that can be covered with a tightly fitted lid. Microscopic examination of a wet film of uncentrifuged urine was carried out to detect the presence of the pus cells, erythrocytes, micro-organisms, casts etc. The urine samples were processed within 1-2hours of collection, using standard microbiological procedures. The culture was done on 5% sheep blood agar and Mac-Conkey agar by standard loop method and incubated at 37°C for 24 hours.

Prolonged incubation was done for further 24 hours if no growth obtained. The identification of organisms was done by Gram staining, motility test, catalase test, oxidase test, coagulase test, and routine biochemical tests as per Cowan and Steels Manual [15]. The growth was interpreted as sterile if no growth obtained. It was interpreted as Significant if the number of colonies corresponded to 10^5 colony forming units (CFU) per ml. Insignificant growth was reported if colony count was less than 10^5 CFUs per ml.

The standardized Kirby-Bauer disc diffusion method on Muller Hinton agar plate as per recommendations of NCCLS (CLSI) was used for antibiotic sensitivity testing [16]. The antibiotics tested were Ciprofloxacin, Norfloxacin, Erythromycin, Ampicillin, Amoxicillin-Clavulanic acid, Amikacin, Sparfloxacin, Co-trimoxazole, Cefotaxime, Ceftazidime, Nitrofurantoin, Piperacillin, Tazobactam, Imipenem, Tobramycin, Cefipime, and Cefoperazone-Sulbactam. All the asymptomatic bacteriuric pregnant women were advised to take treatment.

III. RESULTS

Out of 300 pregnant women examined for asymptomatic bacteriuria, 231 samples were sterile with no growth. Significant bacteriuria was found in 33(11%) cases and insignificant bacteriuria in 12(4%) cases. Growth of contaminants was seen in 24(8%) samples [Table/fig-1].

The highest number of culture positive cases among pregnant women were in the age group of 26-35 years (57%), followed next by 18-25 years (30%) & >36 years (12%). The youngest among the cases studied was 17 years old & the oldest was 41 years old [Table/fig-2].

Significant bacteriuria was found more in primigravida (59%) than multigravida (41%).

In our study, maximum number of culture positive cases were noted in second trimester (54.54%), followed next by first trimester (27.27%) and third trimester (18.19%) (Table/fig-3).

The commonest isolated organism was E.Coli in 24 patients (72.72%), followed by S.aureus in 4 patients (12.12%), Klebsiella pneumonia in 2 cases (6.07%), Acenatobacter, Proteus Mirabilis & Citrobacter each in one case (3.03%) of culture positive cases (Table/fig-4).

In our study, two organisms (6.06%) were found to be resistant to first line antimicrobial drugs like Ampicillin, Co-trimoxazole, Norfloxacin, Cefoperazone & Nitrofurantoin. Out of these two isolates, one each were E.Coli & K.pneumoniae. The two isolates were found to be sensitive to second line drugs. K.pneumoniae was sensitive to Amikacin, and E.Coli was sensitive to Cefuroxime & Ceftazidime.

IV. DISCUSSION

Urinary tract infections are common in females & much more common in pregnancy. Infection of the urinary tract in pregnancy is due to the morphological and physiological changes that takes place in the genitourinary tract during pregnancy [3,5]. Asymptomatic bacteriuria of pregnancy needs special attention, due to lack of symptoms & its adverse consequences in

pregnancy. A cost evaluation study reported that screening for pyelonephritis is appropriate when the prevalence of ASB is greater than 2% [23]. An early detection and treatment of ASB may be of considerable importance not only to forestall acute pyelonephritis and chronic renal failure in the mother, but also to reduce the prematurity & fetal mortality in the offspring [6].

In our study, we found the prevalence of ASB to be 11% and so, screening all antenatal women for ASB, especially in early pregnancy by a quantitative urine culture is recommended.

Overall, the incidence in various Indian studies was found to be between 5 & 12%, and in Western studies, the incidence ranges from 2-7% [3,18]. In the present study, significant bacteriuria was found in 11% cases, which was almost similar to other studies [3,4,5,]. There are not many studies on the incidence of ASB in India. In a study which was by Lavanya SV et al [6], the incidence of ASB was 8.4% in a south Indian population. This may be due to stasis produced by gravid uterus, and since most E.Coli strains prefer that environment, they cause UTI. Another reason could be as a result of poor genital hygiene practices by pregnant women who may find it difficult to clean their anus properly after defecating or to clean their genitals after passing urine [1,3,19]. The early detection of ASB is essential for an early treatment and for the avoidance of complications.

Antenatal women in age group 26-35 years had highest percentage of culture positive cases (57.57%), followed by 18-25 years age (30.30%) & >36 years age (12.13%) respectively (Table/fig-2). Similar age pattern was also observed in other studies [19,20]. The reason may be due to that, most women between 26-35 years age group may be multiparous, and multiparity is a risk factor for acquiring asymptomatic bacteriuria in pregnancy [19,22].

In our study, most culture positive cases were seen in second trimester (54.54%), which was similar to Girishbabu R J study [1] and Nath et al study [11].

The gram negative bacteria were mainly responsible for asymptomatic bacteriuria. E.Coli was commonly found in 24 cases (72.72%) in our study which is similar to different studies, where also E.Coli was found to be the commonest isolate [3,12,24]. The most common organism which was isolated was E.coli (72.72%), followed by S.aureus (12.12%) and Klebsiella Pneumoniae (6.07%).

The isolates were most sensitive to nitrofurantoin and imipenem, followed by ceftazidime, amikacin, cefotaxime, co-trimoxazole, amoxicillin-clavulanic acid & erythromycin.

Incidence of low birth weight babies (50%) and prematurity (75%) was higher in untreated asymptomatic bacteriuric patients in a study by Lavanya S V et al. [24] and Nath et al. [11].

P.Mitra et al. [25] found pre-eclamptic toxemia was more common in the bacteriuric group (9.1%) as compared to abacteriuric group (6%).

All patients with significant bacteriuria were advised to take appropriate antibiotics as per the sensitivity report.

V. CONCLUSION

Significant bacteriuria was present in 11% in this study. The most sensitive test for its detection is urine culture with clean-catch mid stream urine. Women with ASB may have serious

consequences on both mother & fetus. Therefore, it is important to screen all antenatal women for Asymptomatic bacteriuria at their first prenatal visit, preferably in first trimester, and those who are positive should be followed up closely after treatment because about 1/3rd will experience a recurrence. . It's time that we have a look at this strategy for improving the healthcare and for reducing the maternal and foetal morbidity and mortality.

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Table/fig-1: Results of culture:

Results of culture	No. of cases	%
1) Significant bacteriuria	33	11
2) Insignificant bacteriuria	12	4
3) Contamination	24	8
4) Sterile	231	77
Total	300	100

Table/fig-2: Age distribution of Culture Positive cases

Age (years)	No .of culture Positive cases	%
18-25	10	30.30
26-35	19	57.57
>36	04	12.13
Total	33	100

Table/fig-3: Trimester wise distribution of culture positive cases:

Trimester	No.of Culture Positive cases	%
First	09	27.27
Second	18	54.54
Third	06	18.19
Total	33	100

Table/fig-4: Distribution of Culture Positive cases according to bacterial isolates.

Name of Isolate	No. of cases	%
E.coli	24	72.72
S.aureus	04	12.12
Klebsiella pneumonia	02	6.07
Citrobacter	01	3.03
Acenatobacter	01	3.03
Proteus mirabilis	01	3.03
Total	33	100