Research Paper

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

Medical Science

KEYWORDS : Asymptomatic bacteriuria, pregnant women, urine culture

Dr.S.S.M.Umamageswari MD	Associate Professor- Microbiology Chettinad Hospital & Research Institute
Dr. Swarnapriya K MS	Associate Professor- OBG Chettinad Hospital & Research Institute
Dr. A. S. Shameem Banu	Professor and HOD- Microbiology Chettinad Hospital & Research Institute

ABSTRACT

Asymptomatic bacteriuria is common in pregnant women but it is not screened routinely If asymptomatic bacteriuria is not identified and treated among pregnant women, it may lead to many maternal and foetal complications. The objective of this study is to determine the prevalence of asymptomatic bacteriuria among pregnant women, to identify commonest micro-organism causing asymptomatic bacteriuria and their local antimicrobial resistances. urine samples were collected from 330 asymptomatic pregnant woman attending antenatal outpatient department in Chettinad hospital. Control group were 80 healthy non pregnant females. In our study the prevalence of asymptomatic bacteriuria in pregnant women is 9.39%. Escherichia coli (35%) was the most frequently isolated micro-organism, followed by Klebsiella species (16%). Four Escherichia coli and oneKlebsiella were multidrug resistant.All the pregnant women should be screened for asymptomatic bacteriuria by urine culture.

Introduction:

Urinary tract infections are common among all age groups, but women particularly pregnant women are more susceptible than men.[1] During pregnancy profound physiological and anatomical changes like enlarging uterus obstructing the ureters and the bladder, hormonal changes like glycosuria, aminoaciduria provides an excellent medium for bacterial growth that favour urinary tract infection in[2]

Urinary tract infection may occur as asymptomatic bacteriuria or symptomatic bacteriuria. Asymptomatic bacteriuria is the presence of actively multiplying bacteria within the urinary tract excluding the distal urethra but the patient has no symptoms of urinary tract infection. Pregnancy enhances the progression of asymptomatic bacteriuria to symptomatic bacteriuria[3]

Asymptomatic bacteriuria in pregnancy needed medical treatment because urinary tract infection may lead to maternal and foetal complications like pyelonephritis, pre eclamptic toxaemia, and preterm labour, [4] premature rupture of membrane, low birth weight, [4] post partum endometritis and anaemia.

To prevent the complications the screening and treatment of asymptomatic bacteriuria in pregnancy is most important [4]. The organisms causing urinary tract infection and their antimicrobial resistant pattern may vary among different geographical region. [5]

The objective of this study was to identify the prevalence of asymptomatic bacteriuria among pregnant women, to identify the commonest micro organism causing asymptomatic bacteriuria and their local antimicrobial resistances.

Materials and Methods:

A prospective study was conducted at Chettinad health city and research institute from August 2013 to July 2014. The study population was 330 asymptomatic pregnant women attending antenatal outpatient department in Chettinad hospital.

Pregnant women with the history of urinary tract infection like burning mictuirition, suprapubic pain, increased frequency of micturition, fever with chills, hypertension, diabetes and previous history of antibiotic therapy within two weeks were excluded from the study.

Control group were 80 married or unmarried female of fertile age group 18- 45 years in normal health without signs and symptoms of urinary tract infection.

Clean catch midstream urine from the women was sent for culture and sensitivity within one hour of collection. Samples were cultured on cysteine lactose electrolyte deficient (CLED) agar/ Mac conkey agar and blood agar using standard loop by semi quantitative method. The plates were incubated at 37 degree Celsius for 24 hours. Colony count yielding bacterial growth of 10^5 colony forming unit/ ml or more were considered as significant for urinary tract infection. The strains were identified on the basis of standard biochemical reactions. [6]

The isolated organisms from the culture plates were identified by standard biochemical tests. Antibiotic susceptibility test was performed by Kirby Bauer disc diffusion method as per Clinical laboratory standards institute (CLSI) guidelines.[7] The following antibiotics were procured from Hi-media and used: Penicillin (10U), Ampicillin (10μg), Cefazolin (30 μg), High level gentamicin (120 μg), Erythromycin (15 μg), Ciprofloxacin (5 μg), Tetracycline (30 μg), Linezolid (30 μg), Vancomycin (30 μg) and Teicoplanin (30 μg) for Gram positive cocci and Ampicillin (10 μg), Cefazolin (30 μg), Cefuroxime (30 μg), Cefotaxime (30 μg), Cefepime (30 μg), Piperacillin tazobactam (100/10 μg), Amikacin (30 μg), Gentamicin (10 μg), Ciprofloxacin (5 μg), Ofloxacin (5 μg), Tetracycline (30 μg), Imipenam (10 μg) and Meropenam (10 μg) for Gram negative bacilli.

Women with asymptomatic bacteriuria on the basis of urine culture report were treated as per the antibiotic sensitivity for 7 days. Clearance of bacteriuria by repeated urine culture was documented after the antibiotic therapy was completed.

Result:

Out of 330 pregnant women there were 31 samples of urine (9.39%) and only 2 cases (2.5%) out of 80 non pregnant women were positive for significant bacteriuria. Age wise distribution of pregnant women and non pregnant women were given in Table I. There were 178 (54%) pregnant women in the range of 21- 25 years whereas among non pregnant women 36 (45%) were between 21- 25 years.

Table I:
Age wise distribution:

Age in years	Pregnant woman		Non pregnant woman	
	N= 330	%	N=80	%
18- 20	15	5	2	3
21- 25	178	54	36	45
26- 30	82	24	16	20
31- 35	40	12	19	23
36- 45	15	5	7	9

The mean ages of pregnant women and healthy non pregnant women were 26.00 ± 4.66 and 27.82 ± 5.18 years respectively. The youngest among the pregnant was 19 years old and the oldest was 42 years old. The two extremes of ages among healthy non pregnant women were 20 and 42 years. There is a statistical difference in the mean of ages among the pregnant and non pregnant women.

This study shows highest number of culture positive cases among pregnant women in the age group 21- 25 years (45%). This was followed by 26- 30 years (26%) and 31- 35 years (23%). Among the non pregnant women culture positive cases were seen among the age group of 26- 35 years shown in Table II.

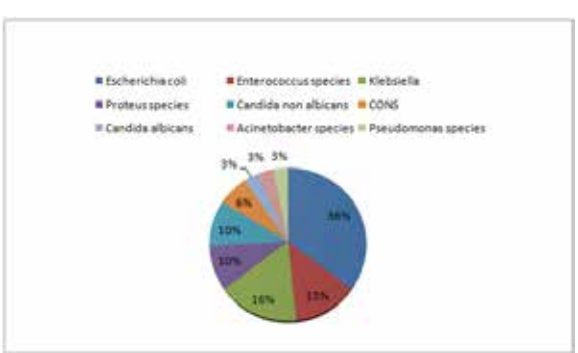
Fig 2:
Age wise distribution of the culture positive cases among pregnant and non pregnant women

Age group in years	Positive cases			
	Pregnant woman		Non pregnant woman	
	N	%	N	%
18- 20	0	0	0	0
21- 25	14	45	0	0
26- 30	8	26	1	50
31- 35	7	23	1	50
36- 45	2	6	0	0

The commonest organism isolated in the significant bacteriuria of pregnant women was *Escherichia coli* 11 (35%) followed by *Klebsiella species* 5 (16%) and *Enterococcus* 4 (13%) and other organisms were shown in Fig 1. The two positive samples of urine were bacteriuric with *Escherichia coli* among the non pregnant women.

Among the gram negative bacilli, *Eschericia coli*- the most common isolate, *Klebsiella species, Proteus species, Acinetobacter species* and *Pseudomonas species* were found to be 100% sensitive to Imipenem, Meropenem, Amikacin and Gentamicin but these isolates were highly resistant to Ampicillin. Four *Escherichia coli* and one *Klebsiella species* were resistant to Piperacillin tazobactum. *Coagulase negative Staphylococcus species (CONS)* and *Enterococcus species*, the gram positive cocci were sensitive strains. Fig 2:

Fig 1:
Spectrum of urinary pathogen isolated from urine samples of pregnant women



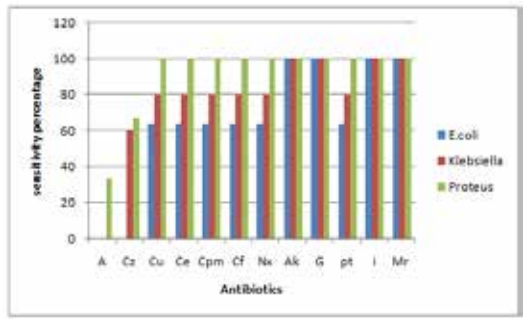


Fig 2:
Antimicrobial pattern of the isolated Gram negative bacilli in the urine of pregnant women

Antibiotics: A= Ampicillin (10µg), Ak= Amikacin (30µg), , Ce= Cefotaxime (30µg), Cf= Ciprofloxacin (5µg), Cpm= Cefepime (30µg), Cu= Cefuroxime (30µg), Cz= Cefazolin (30µg), G= Gentamicin (10µg), I= Imipenam (10µg), Mr= Meropenam (10µg), Nx= Norfloxacin (10µg), Pt= Piperacillin tazobactam (100/10µg).

Discussion:
Pregnant women with asymptomatic bacteriuria show many maternal [8,9] and foetal [9,10] complications, to avoid such sequelae screening for asymptomatic bacteriuria in pregnant women is very important.

The prevalence of asymptomatic bacteriuria in pregnancy was studied with pregnant women as study group and non pregnant women as control groups. Both the groups were age matched. The mean and standard deviation of ages in study group was 26.00 ± 4.66 which was similar to the other studies where the mean ages of pregnant women was found to be 25.33 ± 5.81. [11]

The prevalence of asymptomatic bacteriuria in pregnant women was found to be 9.4% in our study but other study conducted among South Indian population [12] showed the incidence of asymptomatic bacteriuria in pregnancy is 8.4%. Due to difference in socio- economic status of people in different geographical areas the prevalence of asymptomatic bacteriuria is different in different studies. In various Indian studies the incidence was found to be between 5 and 12 %[12, 13] and in Western studies it ranges between 2 to 7 %.[11, 14]

The prevalence of asymptomatic bacteriuria in non pregnant women in our study was 2.5% which was similar as in other studies like 2.85 %.[11] The prevalence of asymptomatic bacteriuria in healthy infant is less than 1% and in older women it is more than 10%.[15] There are no significant differences between asymptomatic bacteriuria in pregnant and non –pregnant women in our study. During pregnancy the prevalence of infection does not change, but there are some variations in the pathogenesis and the complications will be severe in both maternal and foetal health. [11]

The bacteria that cause asymptomatic bacteriuria are of faecal origin which colonizes the periuretheral area. The commonest organisms are gram negative bacteria. Gram negative bacterias were more prevalent than gram positive cocci. As in different studies, *Escherichia coli* [16, 17] were the commonest isolate, as we found in our study. The second most common organism was *Klebsiella* [16, 17] followed by other gram negative bacilli.

Among gram positive cocci, *Enterococci* were found to be commonest in our study which is similar as in study conducted in turkey. [17] But in many studies the commonest cause of asymptomatic bacteriuria is *Coagulase negative Staphylococcus species.* [18]

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Among uropathogen antimicrobial resistance are increasing that makes the clinicians with very few choices of drugs for the treatment of urinary tract infection.

In our study all the gram negative bacilli like *Escherichia coli, klebsiella, proteus, pseudomonas* and *acinetobacter species* were sensitive to carbapenams like imipenam and meropenam. This study revealed that amikacin, ciprofloxacin, cefuroxime and cefotaxime were very effective against urinary isolates. Isolates were highly resistant to ampicillin and cefazolin.

Four *Escherichia coli* and one *klebsiella species* were multidrug resistant, ESBL (Extended spectrum betalactamase) producer.

As a result of antibiotic use and abuse like inappropriate and incorrect administration of antimicrobial agent for the treatment of asymptomatic bacteriuria, the antibiotic resistance among the bacterial isolates increases. [19]

Asymptomatic bacteriuria of pregnancy is difficult to diagnose because of lack of symptoms. If undiagnosed it may led to harmful consequences in pregnancy. All the pregnant women should be recommended for screening for asymptomatic bacteriuria by urine culture. To prevent maternal and perinatal morbidity asymptomatic bacteriuria should be diagnosed and treated as per antimicrobial sensitivity pattern of the isolates.

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