MEDICAL CHANNEL

Original Article

ASYMPTOMATIC BACTERIURIA AND THEIR SENSITIVITY PATTERN IN PREGNANT WOMEN AT LARKANA, PAKISTAN.

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ABSTRACT:

Background: This study provides an update on bacterial isolates and their drug sensitivity pattern causing asymptomatic bacteriuria (ASB) in pregnant women of Larkana region.
Objective: To determine the frequency of common uropathogens and their susceptibility to safe antibiotics that can be used during pregnancy.
Study Design: Prospective descriptive type.
Place and Duration: The study was conducted at public and private hospitals of Larkana from October 2010 to March: 2011.
Subjects and Methods: Urine samples from 520 pregnant women (group-A) and 110 non- pregnant women (Group-B) respectively were sent for culture and if any pathogen was isolated in pregnant women, then sensitivity pattern was looked for various antibiotics.
Results: Of the total 630 cases, from group A&B, 79 cases (15.2%) and 4 cases (3.6%) were positive for culture respectively. There was a significant difference in the frequency of ASB in these two groups, P=0.027. In group A, Escherichia coli was the predominant organism in 49 cases (62%), followed by Staphylococcus aureus 14 cases (18%), Klebsiella pneumoniae 12 cases (15%) and Proteus 4 cases (5%). Fosfomycin and Amoxicillin + clavulanic acid were very effective against all the isolated organisms, while gram –ve bacilli also showed good sensitivity to Ceftriaxone and Nalidixic acid as well.
Conclusion: Frequency of ASB in pregnant women at Larkana was 15.2%. Organisms observed in descending order of frequency were Escherichia coli, Staphylococcus aureus, Klebsiella pneumoniae and Proteus. All the isolated organisms showed good sensitivity to Fosfomycin and Amoxicillin + clavulanic acid.

Key words: Asymptomatic bacteriuria, pregnant and non-pregnant women, urine culture.

INTRODUCTION:

Asymptomatic bacteriuria during pregnancy is the presence of at least 10^5bacteria in one ml of midstream urine samples, with absence of specific signs and symptom of urinary tract infection (UTI) [1]. Stasis of urine, caused by mechanical obstruction of ureter by gravid uterus and dilatation of ureter secondary to increased level of progesterone, favour the bacterial growth during pregnancy, especially during the 12-16 weeks[2]. Glycosuria, proteinuria and aminoaciduria some times observed during pregnancy may be additional factors causing increased frequency of bacteriuria[3]. Significant number of patients if not treated may develop Pyelonephritis[4] that can lead to fetal and maternal complications like premature delivery, low birth weight, maternal hypertension associated with transient renal failure[1,4,5]. Most of these complications can be averted with proper antibiotic therapy[1,6,7]. Screening is an integral part of antenatal care,[6] which is also recommended by American college of obstetrician and gynecology and US preventive services task force[8]. Various cost effective screening methods used to detect ASB during pregnancy, include urinalysis, leucocytes esterase activity, nitrite test and urine culture[6,9]. Quantitative burden of bacteria and their susceptibility to antibiotics can not be assessed by strip method of urinalysis[10]. Leucocytes esterase and nitrite tests are low sensitive methods

for identifying bacteriuria[11], hence can not be regarded as suitable tests for screening. Furthermore these tests do not suggest the appropriate antibacterial drugs for treatment purposes. Urine culture considered as gold standard test is highly specific and the best option because it also provides the correct information about the susceptible antibiotics within 48hours[2,6].

There is no local study to highlight the frequency of asymptomatic bacteriuria among pregnant women attending obstetrical clinics at various public and private hospitals of Larkana, hence this study was conducted to look for common organisms causing ASB and their sensitivity pattern, so that recommendation can be given for the use of proper antibiotics in cases of asymptomatic bacteriuria in pregnant women especially of rural areas of Sindh until the results of culture and sensitivity are available.

MATERIALS & METHODS:

This was prospective, descriptive type of study conducted with the approval of ethical committee of Chandka Medical College, Larkana (CMCL), at the department of Gynaecology and Obstetrics Shaikh Zayyed Women Hospital Larkana and private medical centre of same city. All the pregnant women attending antenatal clinics at above health facilities from October 2010 to March: 2011 were included as a study group A. Females of fertile age who were apparently healthy companions of pregnant ladies were also included as control group B. Before sample collection verbal informed consent was obtained from every woman. Pregnant women with fever, signs and symptoms of urinary tract infection (UTI), known congenital anomalies of urinary tract, history of urinary stones, current antibiotic therapy and diabetes were excluded. Mid stream urine was collected from study as well as from control groups in a sterile wide mouth container. The specimens were promptly processed, cultured on Blood agar and MacConky agar plates, using standard platinum loop delivering 0.002ml of urine in pathology laboratory of CMCL. Plates were incubated aerobically for 24 hours at 37°C. Growth of ? 10^5 organisms/ml was considered as significant. Isolates were identified by grams stain and conventional biochemical methods. Antibiotic susceptibility test was carried out on sensitest agar (oxoid) by using disc diffusion method which principally depends upon the zone of inhibition as recommended by clinical laboratory standard institute guidelines[12], isolated pathogenic micro organisms were inoculated on sensitivity agar and antibiotic discs were placed on the surface of the plates, depending upon the zone of inhibition after incubation for 24 hours at 37°C, sensitivity of the organisms was classified as susceptible (S), intermediate (I), or resistant (R). Data was analyzed using Statistical Package for Social Sciences version (SPSS) 13.

RESULTS:

Five hundred twenty pregnant women with gestational age of 12-16 weeks, and one hundred ten women of fertile age and non pregnant were included as study group A and control group B respectively, the age in group A ranged from 15 to 41 years with a mean age of 24.53 years ± 5.42 SD. While in group B it was also from 15 to 41 years but the mean age was 30.22 years ± 6.06 SD. Mid stream urinary sample yielded significant bacteriuria in 79 cases (15.2%) of pregnant women (group A) While only 4 cases (3.6%) were culture positive in group B. A significant difference was observed between the two groups by pearson chi-Square tests (0.027) (Table-I): Majority of the organisms were gram negative bacilli (82%) and remaining 18% were gram positive cocci, of the 79 culture positive cases in group A, most common organism was Escherichia coli 49 cases (62%), while proteus was isolated in 04 cases (05%) (Table-II). Drug sensitivity of E-Coli was more for nalidixic acid, cefotaxime, ceftriaxone, amoxicillin + clavulanic acid and fosfomycin (Table-III).

Staphylococcus aureus was more sensitive to amoxicillin + clavulanic acid, ampicillin + cloxacillin and fosfomycin (Table-IV).

Klebsiella pneumoniae showed more sensitivity to fosfomycin (Table-V).

Proteus showed more sensitivity to amoxicillin + clavulanic acid, fosfomycin and nalidixic acid (Table-VI).

DISCUSSION:

Screening for asymptomatic bacteriuria is one of the most cost effective strategies adopted, to safeguard the maternal and neonatal health in developing countries[13]. In this study, 520 pregnant women screened for ASB revealed 15.2% cases of significant bacteriuria. The percentage of ASB among pregnant women is higher than earlier reports in national literature observed by Khattak et al [14] and Fatima & Ishrat [15] who reported 6.2% and 9.9% cases for asymptomatic bacteriuria among pregnant women respectively. Our results are also higher than various reports in literature from other Asian countries like Bangladesh 2007 (12%), [16] and Malaysia 2002 (1.9%) [17]. Higher frequency of significant asymptomatic bacteriuria in our study, is due to lower socio-economic status of people of this area as supported by another study of Al Sibiani[18]**.** The finding of ASB in non pregnant control group was 3.6%. Our results are comparable with Khattak et al[14] and Hooton et al[19] who observed 2.85% and 5% cases of ASB respectively. In this study significant difference was observed between frequencies of asymptomatic bacteriuria in study and control groups (P=0.027), however Khattak et al[14] reported no significant difference of ASB in pregnant and non pregnant women (P>0.05). In the present study significant difference is because of more positive percentage of ASB among pregnant women. In our study mean age of pregnant women was 24.53 years ± 5.42SD, this finding coincides with study done by Khattak et al[14] who showed mean ages of pregnant women as 25.33±5.81. Our results in gram -ve bacilli (82%) are higher than a study conducted by Khattak et al[20], who found gram –ve bacilli in about 67% of patients. However yield of gram positive cocci in our study (18%) is lower as compared to above study showing gram +ve cocci in 25% of cases. In this study Escherichia coli was isolated in majority of pregnant women, which is consistent with different national and international studies[15, 16, 21]. E.coli was present in 49 (62%) of our cases, which is comparable with another similar study by Enayat et al [21], who have reported E.coli isolation in 58.96 percentage of pregnant women. However higher percentage of E.coli has been reported in previous studies by Fatima & Ishrat (78.6%)[15] and Ullah et al (75.9%)[16] while lower percentage of this organism has also been reported by Turpin et al (37.5%)[22] and Imade et al (27.1%),[10] the presence of Escherichia coli as a predominant organism in all studies could be due to urinary stasis and poor genital hygienic practices by pregnant women.

Gram positive cocci are recognized as important uropathogens during pregnancy[21] and there is rising trend in the isolation of staphylococcus aureus among asymptomatic pregnant women [23]. In this study staphylococcus aureus was found in 18% of pregnant women. In studies from Iran[21] and Nigeria [10] isolation of

staphylococcus aureus has been seen to be 24.4% and 13.43% respectively. In this study other organisms observed were Klebsiella 15% and proteus 5%. Except Escherichia coli and Staphylococcus, all other organisms are rare in UTI,[24] but Klebsiella pneumoniae was found in 15% of our study thereby suggesting that it is not rare organism in this region.

Considering the health of mother and fetus as precious, only safe antibiotics used during pregnancy were included in in-vitro drug sensitivity testing. In our study, highest sensitivity was observed to Fosfomycin and Amoxicillin+ clavulanic acid in all isolated uropathogens, while gram –ve bacilli were also susceptible to

Table-I:
Chi-Square test for group A (Pregnant) & B (Non pregnant)

	Value	Df	Asymo. Sig. (2-sided)
Pearson Chi-Square	10.925[a]	4	.027
Likelihood Ratio	15.352	4	.004
N of Valid Cases	630		

Table-II:
Pathogens isolated in ASB of pregnant women

Pathogens Isolated	No. of Positive Culture	Gram Stain	Percentage	Cumulative Percent
Escherichia Coli	49	Gram –ve	62	62
Klebsiella	12	Gram –ve	15	77
Proteus	04	Gram –ve	05	82
Staphylococcus	14	Gram –ve	18	100
Total	79	-	100	-

Table-III: Drug sensitivity of Escherichia coli (n=49)

Drug	Susceptible	Intermediate	Resistant
Amoxicillin	16	13	20
Amoxicillin+ Clavulanic acid	40	5	4
Ampicillin+ Cloxacillin	12	11	26
Cefaclor	12	25	12
Cefixime	14	28	7
Cephalexin	37	10	2
Fosfomycin	39	6	4
Ceftriaxone	40	3	6
Cephradine	22	23	4
Cefotaxime	41	03	5
Nalidixic acid	43	02	4

Table-IV: Drug sensitivity of Staphylococcus aureus (n=14)

Drug	Susceptible	Intermediate	Resistant
Amoxicillin	4	6	4
Amoxicillin+ Clavulanic acid	11	1	2
Ampicillin+ Cloxacillin	10	2	2
Cefaclor	1	3	10
Cefixime	6	4	4
Cephalexin	1	1	12
Fosfomycin	10	3	1
Ceftriaxone	4	4	6
Cephradine	7	5	2
Cefotaxime	2	1	11
Nalidixic acid	01	02	11

Ceftriaxone and Nalidixic acid in majority of cases. Escherichia coli and Klebsiella pneumoniae showed high resistance to Ampicillin + cloxacillin but Staphylococcus was highly resistant to Cephalexin and Cefotaxime. Our sensitivity results are in agreement with Imade et al [10] who showed Ciprofloxacin, Ceftriaxone and Amoxicillin + clavulanic acid as very effective drugs against most of the urinary isolates. However we deliberately excluded the ciprofloxacin from our study as quinolones in general are unsafe during pregnancy, our results are also comparable to the findings of Celen et al [25] who found Fosfomycin as highly sensitive antibacterial to most frequently isolated organisms Escherichia coli and also to Klebsiella pneumoniae. A study from Iran conducted by Enayat et al [21] has shown Escherichia coli, the major pathogen to be highly sensitive to Cefotaxime and resistant to Nalidixic acid. The Escherichia coli in our study was not only highly sensitive to Cefotaxime but also to Nalidixic acid in majority of cases. This study observed the Nalidixic acid as most effective antibiotic against the gram negative bacilli, a finding similarly shared by Turpin et all [22].

Table-V: Drug sensitivity of Klebsiella pneumoniae (n=12)

Drug	Susceptible	Intermediate	Resistant
Amoxicillin	5	5	2
Amoxicillin+ Clavulanic acid	7	4	1
Ampicillin+ Cloxacillin	2	1	9
Cefaclor	3	3	6
Cefixime	4	5	3
Cephalexin	5	5	2
Fosfomycin	10	1	1
Ceftriaxone	8	2	2
Cephradine	2	2	8
Cefotaxime	2	3	7
Nalidixic acid	9	1	2

Table-VI: Drug sensitivity of Proteus (n=4)

Drug	Susceptible	Intermediate	Resistant
Amoxicillin	2	1	1
Amoxicillin+ Clavulanic acid	4	0	0
Ampicillin+ Cloxacillin	1	2	1
Cefaclor	1	3	0
Cefixime	1	1	2
Cephalexin	0	3	1
Fosfomycin	4	0	0
Ceftriaxone	3	1	0
Cephradine	1	1	2
Cefotaxime	1	1	2
Nalidixic acid	4	0	0

CONCLUSION:

This study revealed a higher percentage (15.2) of ASB among pregnant women of Larkana region in Pakistan. The Predominant organism isolated was Escherichia coli followed by Staphylococcus aureus, showing good sensitivity to Fosfomycin and Amoxicillin + clavulanic acid.

RECOMMENDATION:

- Pregnant women especially of lower socio-economic status should be advised to keep their good hygienic condition.
- All pregnant women must be screened for asymptomatic bacteriuria by culture and sensitivity.
- The pregnant women attending the antenatal clinics in this area should be initially treated with Fosfomycin or Amoxicillin + clavulanic acid as empirical therapy until reports of culture sensitivity become available.

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