Original Research Article

Prevalence of Asymptomatic Bacteriuria in Antenatal pregnant women in tertiary hospitals

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Abstract

Background: The most common infections among all age groups are the urinary tract infections, mostly among pregnant women.
Aim and Objective: To screen pregnant women for ASB with wet mount, reagent strip test such as UROCOLOR 10, by which both nitrite and leukocyte esterase was detected.
Materials and methods: This was a multi-centric study conducted at Government Hospital Nizamabad and CKM hospital, Warnagal. 150 pregnant women in the age group of 18-40 years without any symptoms of UTI were selected. Control group consisted of 75 non pregnant women who had no signs of UTI and who were within the age group of 18-40 years. Informed consent was taken from all the subjects who participated in the study after explaining the study details in the respective mother's tongue. All the pregnant women without signs and symptoms of UTI were included.
Results: Out of 150 pregnant women, 128 (85%) were sterile, in 15% (22), pure growth of organisms in significant numbers >105 CFU/ml were obtained. There was no growth contamination in any of the urine samples. Wet film had highest specificity of 95% and least sensitivity of 35%, Leukocyte esterase had high specificity of 92% and low sensitivity of 44%, and nitrite test had highest specificity of 97% and highest positive predictive value of 80%.
Conclusion: UTI's are more common among pregnant women than non-pregnant women. ASB is present in 22% of antenatal women. This can be prevented by earlier diagnosis and proper antimicrobial treatment in women and thus prevent obstetric complications. Culture is the standard test, but it is time consuming and very expensive, none is 100 % sensitive even though many screening

tests are available now. Leukocyte esterase and nitrite test are a rapid and inexpensive methods to rule out UTI in women. Wet film can also be used as an alternate screening method.

Key words

Prevalence, Asymptomatic, Bacteriuria, Pregnant women.

Introduction

The most common infections among all age groups are the urinary tract infections, mostly among pregnant women. The anatomical and physiological changes like enlarging uterus obstructing the ureters and the bladder, hormonal changes like glycosuria, aminoaciduria are the factors favouring bacterial growth which in turn favours urinary tract infections, during pregnancy [1, 2]. Increase in prevalence with age or sexual activity due to short urethra, pregnancy and easy contamination of urinary tract with faecal flora because of which asymptomatic bacteriuria is common in women. Bacteriuria is of two types, symptomatic and asymptomatic. Asymptomatic bacteriuria (ASB) [3, 4] is defined as actively and persistently bacteria which multiply in significant numbers i.e. 105 bacteria / ml within the urinary tract without any symptoms. The pregnant women are two times more commonly affected than age matched non-pregnant women. This is due to progesterone effect in pregnancy. In western literature, ASB varies from 2 to 10%, whereas in Indian scenario, prevalence rate is as high as 8%. It is important in detecting ASB in antenatal women, as undetected and untreated ASB may lead to asymptomatic during pregnancy in 25% of culture positive patients. The screening for bacteriuria by urine culture at least once in early pregnancy in all antenatal women, and they can be treated with antibiotics for 3-7 days. Several non-culture screening tests have been devised to detect bacteria because most of the urine specimens given to clinical laboratory for culture are negative or have low colony counts [5]. Wet mount technique along with combination of chemical nitrate and leukocyte esterase dipstick test. Nitrite is not present in healthy person urine. This is a useful test in detecting UTI's caused by nitrate reducing bacteria. Klebsiella species, proteus species and Escherichia Coli species which are present in urine reduce the nitrate to nitrite [6, 7]. In urine, the presence of leukocytes causes inflammation which finally triggers urinary tract infections (UTI'S). The enzyme is detected from both active and lyzed WBC's. When it is not possible to examine fresh urine microscopically for white cells or if the urine is not fresh and contains lyzed WBC's, then Leukocyte esterase testing is an alternative method for detection of pyuria. Using a reagent strip test such as Urocolor 10 which is used to detect nitrite and leukocytes, esterase can be detected. Leukocytes need not be viable leukocyte esterase activity to be detected which is an advantage of this test. The objective of this study was to screen pregnant for ASB with wet mount, reagent strip test such as UROCOLOR 10, by which both nitrite and leukocyte esterase was detected.

Materials and methods

This was a multicentric study conducted at Government Hospital Nizamabad and CKM hospital, Warnagal. 150 pregnant women in the age group of 18-40 years without any symptoms of UTI were selected. Control group consisted of 75 non pregnant women who had no signs of UTI and who were within the age group of 18-40 years. Informed consent was taken from all the subjects who participated in the study after explaining the study details in the respective mother's tongue.

Inclusion criteria was that all the pregnant women without signs and symptoms of UTI were selected).

Exclusion criteria was subjects who were pregnant with diabetes mellitus / hypertension, who had history of antibiotic therapy in the

previous 2 weeks, pyrexia, who had known congenital anomalies of the urinary tract, who had vaginal bleeding, suprapubic pain, multiple pregnancies, history of pre-term delivery, Preterm Premature Rupture of Membrane, intrauterine growth retardation, who had history of UTI symptoms (dysuria, frequency, urgency and burning micturitionetc).

Results

150 pregnant women were selected and attended the Osmania Medical College, Hyderabad during the duration of 3 months period of August to October 2015. Out of 150 samples, 128 (85%) were sterile, in 15% (22), pure growth of organisms in significant numbers >105 CFU/ml were obtained. There was no growth contamination in any of the urine samples.

Table - 1 shows that in the age group of 21-25 years, the asymptomatic bacteriuria was the highest with 45% i.e. in 76 patients, in the age group of 15-20 years, 32% i.e. in 32 patients, in the age group of 26-30 years, 14% i.e. 30 patients, in the age group of 31-35 years, 9% i.e. in 12 patients which was the least. Above 35 years, no cases were found.

Table – 1: Age distribution.

Age in years	Total no. of patients	Asymptomatic bacteriuria	%
15-20	32	7	32
21-25	76	10	45
26-30	30	3	14
31-35	12	2	9

Table - 2 shows that the women from low socio-economic status had the highest of incidence of 77%, followed by middle class, 14% and followed by upper class, 9%.

Table - 3 shows the wet film positive-culture positive, wet film positive-culture negative, wet film negative-culture positive, wet film negative-culture negative were 9, 18, 13 and 110 respectively.

Table – 2: Socio-economic status.

Status	Total no. of patients	Asymptomatic bacteriuria	%
Low	100	17	77
Middle	32	3	14
Upper	18	2	9
Total	150	22	100

Table - 3: Result of wet film with respect to culture.

Wet Film	Culture		
	+	-	Total
+	9	18	27
-	13	110	123
Total	22	128	150

Table - 4 shows leukocyte esterase positive-culture positive, leukocyte esterase positive-culture negative, leukocyte esterase negative-culture positive, leukocyte esterase negative-culture negative were 12, 22, 10, 106 respectively.

Table – 4: Result of leukocyte esterase test with respect to culture.

Leukocyte Esterase	Culture		
	+	-	Total
+	12	22	34
-	10	106	116
Total	22	128	150

Table - 5 shows nitrite test positive-culture positive, nitrite test positive-culture negative, nitrite test negative-culture positive, nitrite test negative-culture negative were 8, 4, 14, 124 respectively.

Table – 5: Result of nitrite test with respect to culture.

Nitrite Test	Culture		
	+	-	Total
+	8	4	12
-	14	124	138
Total	22	128	150

Table - 6 shows the most common bacteria found in ASB was Escherichia Coli (41%), followed by staphylococcus aureus (32%), Klebsiella pneumonia (15%), Enterococcus (4%), proteus mirabilis (4%) and pseudomonas (4%).

Table - 7 shows that all strains are resistant to amoxycillin and ampicillin. There was varying susceptibility to other antibiotics. Wet film had highest specificity of 95% and least sensitivity of 35%, Leukocyte esterase had high specificity of 92% and low sensitivity of 44%, and nitrite test had highest specificity of 97% and highest positive predictive value of 80%.

Table – 6: Organisms in ASB.

Organism present	No. of patients	%
Escherichia Coli	9	41
Staphylococcus aureus	7	32
Klebsiella pneumonia	3	15
Enterococcus	1	4
Proteus mirabilis	1	4
Pseudomonas	1	4

Table – 7: Antibiotic susceptibility of isolates.

Organism present	No. of isolates	Nitrofurantoin (300µg)	Cefuroxime (30µg)	Gentamycin (10µg)	Cephalexin (30µg)	Cefotoxime (30µg)	Amikacin (30µg)	Amoxycillin (25µg) & Ampicillin (10 µg)
Escherichia Coli	9	4	4	6	1	4	6	-
Staphylococcus aureus	7	2	2	4	-	2	4	-
Klebsiella pneumonia	3	2	-	2	-	-	1	-
Enterococcus	1	1	1	1	-	-	-	-
Proteus mirabilis	1	1	-	1	1	2	-	-
Pseudomonas	1	1	-	1	-	-	1	-

Discussion

Many studies reported the prevalence of asymptomatic bacteriuria among pregnant women. Dr. Anjana Telkar, et al. [8] determined the prevalence of ASB in pregnant women, to isolate, identify the etiological agents that cause ASB and to determine its antimicrobial susceptibility pattern. This study consisted of 100 pregnant female patients in the age group of 18-45 years without any signs and symptoms of UTI. Clean catch midstream urine samples were collected and Urine culture was done using conventional microbiological techniques**.** Biochemical testing was used to identify the organisms and antibiotic sensitivity was done by the Kirby Bauer disc diffusion method according to standard CLSI guidelines. Rapid screening tests were done by wet mount, gram's staining, reagent strip test such as UROCOLOR 10 which detects both nitrite and leukocyte esterase (LE). The results were that out of 100 samples, 87 were sterile. Organisms in pure culture in significant number were obtained in 13 cases. ASB was more common in the low socioeconomic group, in the age group of 21-25years and the organism most commonly isolated was E.coli 5 (38%). The screening tests like wet mount showed 92% specificity, Gram's staining showed 76% of sensitivity, LE showed 91% of specificity whereas nitrite test showed 98% of specificity. This study concluded that urinary tract infection (UTI) are more common in pregnant than non-pregnant women. UTI are associated with risk to both the foetus and the mother, including pyelonephritis, LBW and increased perinatal mortality. The earlier diagnosis and proper antimicrobial treatment in these women would prevent the obstretic complications. Dr

Rajashekhar D. Kerure, et al. [9] determined the prevalence of Asymptomatic bacteriuria (ASB) in pregnant women and 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 and 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 Staphyloccus 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 and other complications in both mother and fetus. Dr. S.S.M. Umamageshwari, et al. [10], 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 one Klebsiella were multidrug resistant. All the pregnant women should be screened for asymptomatic bacteriuria by urine culture. Chandel Lata R, et al. [11] conducted a prospective study in the Department of microbiology (IGMC) and the Department of obstetrics and 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. The pregnant women were taught to collect the urine sample by aseptic technique which was then subjected to semi quantitative culture method. Significant bacteriuria was present in 7.34% cases. About 78% samples were found to be sterile. S Khan, et al. [12], in this study findings were reported regarding the drug resistance patterns of bacteria isolates from pregnant women with urinary tract infections(UTI's). This study included 1358 pregnant women attending the antenatal clinic at the Department of Ob-stetrics and Gynecology between July 2013 and August 2014. Urine specimens were processed for isolation and identification of bacterial species following standard microbiological methods. The disc diffusion test was used to determine the antimicrobial resistance patterns of the recovered isolates at the central laboratory of microbiology of Nepalgunj Medical College, Nepal. Three hundred and seventeen isolates were positive for significant bacteriuria. E. coli, K. pneumonia, P. aeruginosa, E. faecalis, S. aureus, P. mirabilis, Three hundred and seventeen isolates were positive for significant bacteriuria. E. coli, K. pneumonia, P. aeruginosa, E. faecalis, S. aureus, P. mirabilis, and P. Vulgaris accounted for 61.5%, 17%, 7.5%, 5.3%, 2.8%, 2.5%, 1.8% and 1.2% of bacterial isolates respectively. Resistance to erythromycin (58.6%), co-trimoxazole (57.4%) and ciprofloxacin (50.1%) was observed. Among the 317 positive isolates, 203 (64%) were from women in the 21e30-year-old age group, and the rate of bacteriuria in this group was statistically significantly more than those for the other age groups ($P < 0.05$). This study concluded that bacteriuria is frequent among pregnant women, which generates a need for routine urine culture screening. In this study, E. coli was the most predominant bacterial species identified followed by K. pneumonia. Furthermore, women in the 21-30-year-old group were at a higher risk of UTI. Erythromycin, co-trimoxazole and ciprofloxacin should not be empirically used as first-line drugs

in the treatment of UTIs. Continuous local monitoring of resistance patterns is necessary to deter- mine the appropriate empirical antimicrobial therapy.

Conclusion

It can be concluded that ASB is present in 22% of antenatal women. This can be prevented by earlier diagnosis and proper antimicrobial treatment in women and thus prevent obstetric complications. Culture is the standard test, but it is time consuming and very expensive, none is 100% sensitive even though many screening tests are available now. Leukocyte esterase and nitrite test are a rapid and inexpensive methods to rule out UTI in women. Wet film can also be used as an alternate screening method.

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