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Original research article

Maternal and fetal outcome in asymptomatic bacteriuria

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Abstract

Background: Asymptomatic bacteriuria is associated with poor feto-maternal outcomes. This study was done to evaluate the fetal and maternal outcomes in antenatal women with asymptomatic vs symptomatic bacteriuria.

Materials and methods: A total of 1000 antenatal women who presented to the outpatient department of obstetrics and were found to have pyuria were selected. Out of them, 300 antenatal women who fit the inclusion criteria were selected and divided into two groups-one group consisting of women with asymptomatic bacteriuria and another with symptomatic bacteriuria. Demographic details, risk factors, isolated organisms from urine culture, and maternal and fetal outcomes were compared between the two groups.

Results: The Prevalence of asymptomatic bacteriuria observed in the study population was 9.3%. E. coli was the most common organism isolated (64.3%). The commonest maternal morbidity was preterm labor (14.3%) and the commonest fetal morbidity was low birth weight (14.3%). No maternal or fetal mortality was observed.

Conclusion: Asymptomatic bacteriuria is associated with significant feto-maternal morbidity.

Keywords: Maternal outcomes, antenatal women, asymptomatic, symptomatic bacteriuria

Introduction

Pregnancy is heralded by changes in the genito-urinary system which occur under the influence of female sex hormones. These changes include relaxation of the smooth muscles of the urinary tract, increased alkalinization of urine due to increased excretion of bicarbonates, and mechanical compression of the ureters by the enlarging uterus. These changes enhance the colonization of the urinary tract by organisms such as Escherichia coli (E. coli), Klebsiella, Proteus, and Staphylococcus species [1]. Bacteriuria can be seen in the general population but occurs more in pregnancy due to physiological changes that occur in pregnancy. Asymptomatic bacteriuria (AB) is defined as the "presence of 10^5 or more actively multiplying organisms per milliliter in two consecutive clean catch urine specimens or a single catheter specimen, in the absence of urinary symptoms" [2]. The reason for the asymptomatic clinical state has been related to the absence of Type 1 fimbriae found in certain strains of bacteria, particularly E. coli This fimbriae is immunogenic and its presence initiates the immune/inflammatory response, which leads to the development of symptoms whereas its absence leads to absence of symptoms [1]. In making the diagnosis of asymptomatic bacteriuria, technically, two consecutive samples are ideally collected. This helps to reduce the incidence of false positive results. The use of midstream urine culture is superior to the other methods of screening as it equally studies antimicrobial sensitivity.

Urinary tract infection can be symptomatic or asymptomatic. The symptomatic urinary tract infection can be uncomplicated or complicated. If asymptomatic bacteriuria is not treated, approximately 25% of women will subsequently develop acute symptoms of an infection during pregnancy. Low socio-economic status, sickle cell trait, diabetes mellitus and grand multiparty predispose to urinary tract infection, and each is associated with a two-fold increase in the rate of bacteriuria. Patients with abnormalities of the urinary tract, stones in the urinary tract, immunosuppressants, and a history of urinary tract infection had an increased risk of ASB [3].

Asymptomatic bacteriuria (ASB) is an entity with possibly serious consequences in the form of fetal and maternal morbidity. It can cause maternal anemia, acute pyelonephritis, recurrent infection, preterm labor,' septicemia and even death of the mother". It can cause intrauterine growth restriction" prematurity, and low birth weight of the fetus, and fetal mortality [4].

This study was taken up to evaluate the feto-maternal outcomes in asymptomatic vs. symptomatic bacteriuria.

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Materials and Methods

This hospital-based prospective study was done in the Department of Obstetrics and Gynaecology, Kamineni Institute of Medical Sciences over 2 years (2021-2023). 1000 pregnant women between 20-36 weeks of gestation, attending the antenatal outpatient department, who upon routine complete urine examinations had pyuria, were selected for the study. Out of the 1000 screened patients, 300 patients had urinary tract infections, which were divided into two groups. Group A comprised of antenatal women who had no symptoms of urinary tract infection and group B comprised of antenatal women who had symptoms of UTI like abdominal pain, fever, burning micturition, increased/decreased frequency of micturition, and dysuria. Patients with a history of urinary tract infection previously, within the past one year, patients with diabetes, chronic hypertension, hypertensive disorders in previous pregnancies, renal disorders, heart disease, and other pre-existing medical disorders, or patients who are taking antibiotics currently or in the last 6 months due to various reasons were excluded from the study.

Patients were explained about the study and were included who gave their consent. They were instructed about collecting midstream urine samples in a sterile, plastic container by clean catch method for urine culture & Sensitivity. The sample was cultured on culture media like Blood Agar and Mac Conkey's Media. The number of organisms per ml of urine was calculated. Semi-quantitative method of culture by calibrated loop technique was used. The sample was tested for the type of

The organism in the culture and its antibiotic sensitivity were tested and reported with 1st line and, in some cases, 2nd line drugs. If there are >105 pathogenic organisms belonging to a single species of 1 ml of urine, that was taken as significant bacteriuria.

Results

During the study period, a total of 1000 antenatal women were screened, of which 300 patients were positive for UTI. Of the 300 patients 28 (9.33%) were asymptomatic, belonging to group A, and 272 (90.67%) were symptomatic, belonging to group B. The majority of women in both groups belonged to 20-30 yrs of age (Group A-50%; Group B-84.5%). Most of the women in both groups belonged to lower socioeconomic status (group A-85.7%; group B-97.1%). The majority of women who were asymptomatic (group A) were primigravida (71.4%). Whereas, the majority of symptomatic women (group B) were Multigravida (92.7%). p=0.000012 (<0.01) Highly Significant. Most of the asymptomatic women (group A-64.3%) and symptomatic women (group B-84.9%) delivered at term. 25% of Group A women had preterm labor, whereas 11.8% of Group B women had preterm labor. This was found to be statistically significant (×= 8.2, p=0.01). 3.7% of Group A women and 1.1% of Group B women had PROM. However, the majority of the women in both groups did not have PROM. Pre-eclampsia was seen in 3.57% of Group A and 0.73% of Group B. A total of 11.66% of women, in either group had statistically significant maternal morbidity.

14.3% women of in Group A and 4.4% of women in Group B delivered low birth-weight babies (birth weight <2.5 kgs). All the babies born to Group A women had a normal APGAR score, while 1.1% of babies born to Group B women had a low APGAR score (less than 7/10). This difference was not statistically significant. 7.14% of babies of Group A women and 2.9% of babies of Group B women were admitted to NICU Escherichia Coli was the most common organism isolated in both groups (group A-64.28%; group B-67.6%). There were no cases of Alpha Haemolytic Streptococci organism being isolated. Nitrofurantoin was the commonest antibiotic found to be sensitive (68.6%). The least common sensitivity was to sulfamethoxazole/trimethoprim (5%).

Study population (n=300)		**Group A (n= 28; 9.3%)**	**Group B (n = 272; 90.67%)**	**P value**
Socioeconomic status	Low	24 (85.7%)	264 (97.1%)	p=0.002 Significant
	Middle	4 (14.3%)	6 (2.2%)	
	High	0	2 (0.7%)	
Gravid	Primi gravida	24 (71.4%)	20 (7.3%)	p=0.000012 Significant
	Multi gravida	4 (28.6%)	252 (92.7%)	
Gestational age at time of delivery	<37 wks	7 (25%)	32 (11.8%)	p=0.01 Significant
	37-40 wks	18 (64.3%)	231 (84.9%)	
	>40 wks	3 (10.7%)	9 (3.3%)	
PROM	With PROM	1 (3.7%)	3 (1.1%)	P = 0.32, Not significant
	Without PROM	27 (96.3%)	269 (98.9%)	
Maternal morbidity	With maternal morbidity (n = 35)	8 (28.5%)	27 (9.9%)	p = 0.04 Significant
	Without maternal morbidity (n = 265)	20 (71.4%)	245 (90.8%)	
Birth weight of child	<2.5 kg	4 (14.3%)	12 (4.4%)	p=0.000021 Significant
	2.5-3.5 kg	13 (46.4%)	248 (91.2%)	
	>3.5 kg	11 (39.3%)	12 (4.4%)	
APGAR score	Low APGAR	0	3 (1.1%)	p value= 1 Not significant
	Normal APGAR	28 (100%)	269 (98.9%)	

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NICU	Admission required	2 (7.1%)	8 (2.9%)	p=0.2 Not significant
	Admission not required	26 (92.8%)	264 (97.1%)	
Isolated organism	E. coli	18(64.2%)	184 (67.6%)	
	Coagulase nepgative staphylococcus	8 (28.5%)	62 (22.7%)	
	Klebisiella	2 (7.1%)	26 (9.5%)	

Discussion

Urinary tract infection is one of the most common bacterial infections encountered during pregnancy. The relatively higher prevalence of urinary tract infections during pregnancy is due to the physiological changes that occur, making them more susceptible.

The prevalence of urinary tract infection as observed in this study is 9.3%, which is similar to the study done by Norden CW (2-10%) [5] and Bachman (2-7%) [6]. Escherichia Coli was found to be the commonest organism isolated in the study (64.28%). Others were Klebsiella Pneumonia, and Coagulase Negative Staphylococcus, which were found in fewer numbers. This is similar to the findings of previous studies by A. Masinde *et al*. (63.2%) [7]. and Keah SH *et al*. (61.34%) [8].

The highest prevalence was found in women in the 20-30 yrs age group and the lowest in more than 30 years. This is probably most of the patients who had their pregnancy during this period 48. The most common age group noted by Gebre-Sclassie [9] in their study was also 20-30 years and found a significant association with age and asymptomatic bacteriuria.

The highest parity in the asymptomatic bacteriuria group was in primigravida accounting for 71.4%. Several authors have reported an increasing rise of asymptomatic bacteriuria with age and parity like Turpin (2012) [10] *et al*. in their study. However, Mc Fadyen (2010) [11] found no relationship with age or parity. Most (85.7%) of the patients with ASB in the present study belonged to the low socioeconomic group, similar to many studies, like Whalley *et al*. (1998) [12].

25% of ASB patients had Preterm deliveries in the current study. Findings from Cardiff birth survey [13] which prospectively studied 25.844 births and reported that ASB is not associated with preterm delivery. The authors concluded that ASB would be associated with preterm births only when it progresses to pyelonephritis. Whereas, Robert Mittendorff *et al*. (2002) [14] found in their study that there is a significant association between preterm births and asymptomatic bacteriuria. Low birth weight was seen in 14.3% of the present study. Jain V *et al*. [15] reported that there was a strong association between untreated urinary tract infection and low birth weight, which is in accordance with the present study.

Conclusion

This study concludes that asymptomatic bacteriuria is associated with significant fetal and maternal morbidity. Timely management of infection can prevent the progression of infection and thereby lessens morbidity.

References

1. Izuchukwu KE, Oranu EO, Bassey G, Orazulike NC. The maternofetal outcome of asymptomatic bacteriuria among pregnant women in a Nigerian Teaching Hospital. Pan Afr Med J. 2017 May;27:69. Doi: 10.11604/pamj.2017.27.69.10492. PMID: 28819490; PMCID: PMC5554673.
2. Jain V, Das V, Agarwal A, Pandey A. Asymptomatic bacteriuria & obstetric outcome following treatment in early versus late pregnancy in north Indian women. Indian J Med Res. 2013 Apr;137(4):753-8. PMID: 23703344; PMCID: PMC3724257.
3. Rubenstein JN, Schaeffer AJ. Managing complicated urinary tract infections: The urologic view. Infect Dis Clin North Am. 2003;17:333-351.
4. Tayo AO, Ol AKinola, TA Ottun, JAA Onakoya, Ogunsanya AO. Appraisal of asymptomatic bacteriuria in pregnancy. Nigerian Journal of clinical medicine, 2010, 3(2).
5. Norden CW, Kass EH. Bacteriuria in pregnancy-a critical appraisal annual review of medicine. 1968;19:431-70.
6. Bachman JW, Heise RH, Naessens JM, Timmerman MG. A study of various tests to detect asymptomatic urinary tract infections in an obstetric population. JAMA. 1993;270(16):1971-1974.
7. Masinde A. Prevalence of urinary tract infection among pregnant women at Bugando Medical Centre, Mwanza, Tanzania Tanzania Journal of Health Research. 2009 July;11(3):154-161.
8. Keah SH, Wee EC, Chng KS, Keah KC. Antimicrobial susceptibility of community-acquired uropathogens in general practice. Malaysian Fam Physician. 2007;2:64-9.
9. Gebre Selassie S. Asymptomatic bacteriuria in pregnancy: epidemiological, clinical and microbiological approach. Ethiop Med J. 1998 Jul;36(3):185-92.
10. Turpin CA, Bridget Minkah, Danso KA, Frimpong EH. Ghana Med J. 2007 March;41(1):26-29.
11. McFadyen IR, Eykyn SJ, Gardner NHN, Vanier TM, Bennett AE, Mayo ME, *et al*. Bacteriuria in pregnancy. J Obstet Gynaecol Br Commonwealth. 1973;80:385-405.
12. Whalley P. Bacteriuria of pregnancy. Am J Obstet Gynecol. 1967;97:723-738.
13. McGladdery SL, Aparicio S, Verrier-Jones K, Roberts R. Outcome of pregnancy in an Oxford-Cardiff cohort of women with previous bacteriuria. QJM. 1992;83(303):533-9.

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 09, 2023

14. Robert Mittendorf, Michelle A Williams, Edward H Kass. Prevention of preterm delivery and low birth weight associated with asymptomatic bacteriuria. Clin Infect Dis. 1992;14(4):927-932.
15. Jain V, Das V, Agarwal A, Pandey A. Asymptomatic bacteriuria & obstetric outcome following treatment in early versus late pregnancy in north Indian women. Indian J Med Res. 2013 Apr;137(4):753-8. PMID: 23703344; PMCID: PMC3724257.