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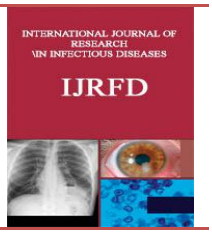

ASSOCIATION OF ASYMPTOMATIC BACTERIURIA WITH OBSTETRIC OUTCOME IN PREGNANT WOMEN ATTENDING ANTENATAL CLINICS

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ABSTRACT
With the aim to determine association of asymptomatic bacteriuria with obstetric outcome in women, present study was carried out on pregnant women between 20-24 weeks of gestational age attending antenatal clinics at *Rajkiya Mahila Chikitsalya*, Ajmer, Rajasthan, India during one year. All patients were subjected to complete urine examination and urine culture and were categorized as urine culture positive and urine culture negative. Patients were followed till delivery and perpeurium and foetomaternal outcome was recorded. A higher percentage of preterm deliveries in patients having positive urine culture as compared to those having negative urine culture was observed. No association between the mode of delivery and urine culture positivity was observed. There was a higher frequency of low birth weight babies in urine culture positive patients than in urine culture negative patients. None of the known morbidity factors such as gestational *diabetes mellitus*, previous intra uterine death, previous preterm and history of recurrent abortions had any effect on the prevalence of urinary tract infection. There was a higher frequency of complications in asymptomatic bacteriuric patients. Results implied the association of asymptomatic bacteriuria with preterm deliveries, low birth weight deliveries, preterm premature rupture of membranes and maternal complications like pyelonephritis. On the basis of upshot of the study, it can be recommended that all women attending antenatal clinics should be subjected to urine culture at 20-24 weeks of gestation so that asymptomatic bacteriuria can be detected well in time and due precautions can be taken to reduce the maternal and neonatal morbidity and mortality.

INTRODUCTION

Pregnancy brings about several adjustments in the woman's body. Hormonal and mechanical changes increase the risk of urinary stasis. Difficulty with hygiene due to a distended pregnant belly increase the frequency of urinary tract infections in pregnant women. Urinary tract infections (UTI) are the most common bacterial infections of pregnancy[1]. Asymptomatic bacteriuria is commonly defined as the presence of more than 100,000 organisms/ml in two consecutive urine samples in the absence of declared symptoms.Asymptomatic bacteriuria (ASB), occurring in 2–11% of pregnancies, is a major predisposition to the development of pyelonephritis, which is associated with obstetrical complications, such as preterm labour and low birth weight infants. Asymptomatic bacteriuria during pregnancy if left untreated, may lead to acute pyelonephritis, preterm labour, low birth weight

foetus, *etc*. Adequate and early treatment reduces the incidence of these obstetric complications[2]. Bacteriuria is defined as the presence of >105 colonies of a single pathogen per ml of urine. It may be either an asymptomatic bacteriuria (ASB of pregnancy) or symptomatic acute cystitis and acute pyelonephritis[3]. When left untreated, ASB may lead to symptomatic urinary tract infections (UTI)[4]. Untreated, ASB is found to be associated with subsequent acute pyelonephritis in 20–50% of cases[5].

Twenty to thirty percent of asymptomatic bacteriuria in pregnancy progress to symptomatic infection. This progression is very rapid during pregnancy. Symptomatic bacteriuria may convert into pyelonephritis which has been associated with maternal as well as foetal morbidity and mortality[6]. Pregnant urine is a suitable culture medium than non pregnant because the pH is higher than 6. Obstetricians are highly concerned about the fact that pregnant women are vulnerable to have a large number of bacteria in the urine in absence of symptoms.

The female urethra is relatively short and is anatomically proximal to the vagina, which is colonized with organisms from the gastrointestinal tract. Normal physiological changes in pregnancy place women at risk for pyelonephritis. There is also relative obstruction of the ureters because the enlarging uterus physically blocks them and the hormonal milieu of pregnancy leads to relaxation of the smooth muscle of the ureters and the bladder. Furthermore, the glycosuria and aminoaciduria of pregnancy provide an excellent medium for bacterial proliferation[7,8]. The relatively high prevalence of ASB during pregnancy, the significant consequences for women and pregnancy and the ability to avoid undesired outcomes with treatment justify screening and treatment of ASB in pregnancy[9]. The frequency of isolated pathogens and antimicrobial resistance patterns can vary in different geographical regions. Local area study can help in improving health status of women. Investigation of the most common causative agents among women increases awareness regarding local antimicrobial resistances. The objective of this study was to find out the association between asymptomatic bacteriuria and foetomaternal outcome.

MATERIALS AND METHODS

Present study was conducted at *Rajkiya Mahila Chikitsalaya*, Ajmer, Rajasthan during one year period. Pregnant women from 20 to 24 wk gestation (n=150) having no urinary complaints were included in the study irrespective of age and parity. Patients who were in labour and those taking antibiotics while appearing for antenatal clinics were excluded from the study. Detailed history including complaints of urinary infection, obstetric history, menstrual history and past history were recorded. General physical and obstetric examination was carried out. Ultrasonography was done to rule out incompetent os. Early morning first mid stream clean catch urine samples than in urine culture negative patients.

were collected both for urine microscopy and urine culture. As per urine microscopy and culture reports, patients were categorized as urine culture positive and urine culture negative. Women were followed till delivery for obstetric outcome. Regular obstetric examination was done at each visit and any abnormal antenatal finding was recorded. The patients were closely observed for any morbidity during the antenatal period like fever and urinary tract infection during pregnancy, intra uterine growth restriction of foetus, premature labour pains, premature rupture of membranes etc. Foeto-maternal outcome variables of the patient were noted in terms of gestation age at the time of delivery, weight of newborn and other complications like intra uterine growth retardation and intrauterine foetal death. The mother was closely observed during the postnatal period for persistence of pyelonephritis like any history of dysuria, frequency of urination or rise of temperature.

RESULTS

Present study was carried out on 150 asymptomatic pregnant women between 20-24 weeks of gestational age attending antenatal clinics at *Rajkiya Mahila Chikitsalya*, Ajmer during one year. All patients attending antenatal clinic were subjected to complete urine examination and urine culture. Patients were categorized as urine culture positive and urine culture negative. Patients were followed till delivery and perpeurium and foetomatermal outcome was recorded. Out of 150 patients, 16 patients were found urine culture positive and 134 patients found urine culture negative. During follow up, 6 patients did not turn up.

Relationship between time of delivery and urine culture is presented in table 1. In culture positive patients group, 71.43% delivered at term whereas 28.57% delivered prematurely.In culture negative patients group, 84.62% patients delivered at term whereas 15.38% delivered prematurely. A higher percentage of preterm deliveries in patients having positive urine culture as compared to those having negative urine culture was observed.

Distribution according to mode of delivery and urine culture is presented in table 2. In culture positive patients group, 42.86% delivered by caesarean section whereas 57.14% had vaginal delivery. In culture negative patients group, 30.00% delivered by caesarean section whereas 70.00% had vaginal delivery. Indications for caesarean section included foetal distress, non progress of labour, cephalopelvic disproportion, previous caesarean delivery and malpresentation. No association between the mode of delivery and urine culture positivity was observed.

Relationship of birth weight and urine culture is presented in table 3.In culture positive patients group, 35.71% had low birth weight (LBW, birth weight <2.5kg) while 64.29% had normal birth weight. In culture negative patients group, 20.00% had low birth weight whereas 80.00% had normal birth weight. There was a higher frequency of LBW babies in urine culture positive patients

Distribution of morbidity according to urine culture is presented in table 4. In culture positive patients group, 7.14% had gestational *diabetes mellitus* (GDM) and 7.14 % had history of intrauterine death (IUD) in previous pregnancy. In culture negative patients group, 3.07% had GDM, 0.77% had previous IUD, 1.54% had previous preterm delivery and 0.77% had history of recurrent abortions. None of the known morbidity factors such as gestational *diabetes mellitus*, previous IUD, previous preterm and history of recurrent abortions had any effect on the prevalence of urinary tract infection.

Distribution of complications according to the urine culture is presented in table 5.Out total culture positive patients, 21.43% patients had intrauterine growth restriction (IUGR) ,14.28% patients had premature prolonged rupture of membranes (PPROM), 7.14% patients had intra uterine death (IUD) and 7.14% patients developed pyelonephritis. Among culture negative patients, 6.92% had IUGR, 2.30% had PPROM, 2.30% had IUD, 0.77% was large for date and 2.30% developed pregnancy induced hypertension (PIH). There was a higher frequency of complications in asymptomatic bacteriuric patients.

Table 1. Relationship between time of delivery and urine culture (n=144)

Time of delivery	Urine culture (n=144)		Total
	+ve	-ve	
Term	10 (71.43%)	110 (84.62%)	120 (83.33%)
Preterm	4 (28.57%)	20 (15.38%)	24 (16.67%)
Total	14 (100.00%)	130 (100.00%)	144 (100.00%)

Table 2. Distribution according to mode of delivery and urine culture

Mode of delivery	Urine culture (n=144)		Total
	+ve	-ve	
LSCS	6 (42.86%)	39 (30.00%)	45 (31.25%)
Vaginal & other	8 (57.14%)	91 (70.00%)	99 (68.75%)
Total	14 (100.00%)	130 (100.00%)	144 (100.00%)

Table 3. Relationship of birth weight and urine culture

Birth weight	Urine culture (n=144)		Total
	+ve	-ve	
LBW	5 (35.71%)	26 (20.00%)	31 (21.53%)
NBW	9 (64.29%)	104 (80.00%)	113 (78.47%)
Total	14 (100.00%)	130 (100.00%)	144 (100.00%)

Table 4. Distribution of morbidity according to urine culture

Morbidity	Urine culture	
	+ve (n=14)	-ve (n=130)
GDM (Gestational *Diabetes mellitus*)	1 (7.14%)	4 (3.07%)^{NS}
Prev-IUD (Previous intra uterine death)	1(7.14%)	1(0.77%) ^{NS}
Prev-Pre term	0	2(1.54%) ^{NS}
Recurrent abortions	0	1(0.77%) ^{NS}

^{NS} = Values in a row for a parameter differ non significantly ($p>0.05$)

Table 5. Distribution of complication according to the urine culture

Complications	Urine culture	
	+ve (n=14)	-ve (n=130)
Intra uterine growth restriction (IUGR)	3 (21.43%)	9 (6.92%) **
Premature prolonged rupture of membrane (PPROM)	2 (14.28%)	3 (2.30%) *
Intra uterine death (IUD)	1(7.14%)	3 (2.30%) ^{NS}
Large for date	0	1 (0.77%)
Pregnancy induced hypertension (PIH)	0	3 (2.30%)
Pyelonephritis	1 (7.14%)	0

* = Values in a row for a complication differ significantly ($p\leq0.01$)

** = Values in a row for a complication differ significantly ($p\leq0.05$)

^{NS} = Values in a row for a complication differ non significantly ($p>0.05$)

DISCUSSION

Asymptomatic bacteriuria was found to be associated with preterm deliveries. In present study 28.57% culture positive patient delivered prematurely, which was two times higher than culture negative patients (15.38%). Asymptomatic bacteriuria was found to be associated with low birth weight deliveries. In Present study, 35.71% culture positive patients delivered low birth weight infants which was one and half times higher than culture negative patients (20.00%). This is in agreement with the earlier landmark studies[10], which revealed 54% risk of preterm delivery and 95% risk of low birth infants in non bacteriuric patients versus bacteriuric patients. Women who acquire UTI during pregnancy are at increased risk of delivery of low birth weight, preterm and preterm low birth weight infants. In present study, relative risk (RR) of 1.86 for preterm delivery and RR of 1.79 for low birth infants in asymptomatic bacteriuric patients against non bacteriuric patients were found. Preterm birth has been defined as delivery before 37 completed weeks. Low birth weight is present when the newborn baby weighs less than 2500 gm[11].

Asymptomatic bacteriuria was found to be associated with preterm premature rupture of membranes. In present study 14.28 % patients had preterm premature rupture of membranes (PPROM) among all culture positive patients. Asymptomatic bacteriuria was found to be associated with maternal complications like pyelonephritis. In present study 7.14% patients developed pyelonephritis in culture positive patients. Adverse complications seen in present study included pyelonephritis, IUGR and PPROM. Pyelonephritis was ascertained using criteria of temperature >38^{o}C, costovertebral tenderness, bacteriuria and pyuria[12]. IUGR is assessed on the basis of the fact that a foetus is unable to attain its growth potential. For this birth weight below the 10 percentile at that gestation as IUGR and above 90 percentile as large for gestation age was taken. Birth weights in between the 10th and 90th percentile are defined as appropriate for gestational age. Premature prolonged rupture of membrane (PPROM) is considered when membrane ruptures before the 37th completed weeks of gestation age[11]. The relationship of ASB with other maternal and foetal complications remains an area of continued debate. ASB is known to be associated with IUGR and hypertensive disorders of pregnancy and LBW infants[13]. In a retrospective population based study by multivariate analysis with backward elimination, ASB was found to be independently associated with IUGR[14]. Findings of present study in light of above discussion clearly emphasize the importance of early detection and treatment of ASB. The risk of developing symptomatic UTI and acute pyelonephritis in pregnant women with ASB is well established. An incidence of 1.4 per cent of acute pyelonephritis in pregnancy was reported by earlier workers[15]. An earlier study showed the overall incidence of pyelonephritis in the untreated ASB group to be 21 per cent with a range of 2.5 to 36 per cent[16] . Researchers have reported a reduction in ensuing symptomatic UTI by 80-90 per cent upon successful treatment [17].

Urine culture was found to be gold standard during the investigation of affected population in present study[18]. Results implied the association of asymptomatic bacteriuria with preterm deliveries, low birth weight deliveries, preterm premature rupture of membranes and maternal complications like pyelonephritis. Study also demonstrated that if disease was detected late in pregnancy it might lead to various maternal and neonatal complications like PPROM, IUGR and LBW despite treatment of infection. All the sequelae of ASB during pregnancy could be reduced by antimicrobial treatment early in pregnancy. Hence, screening and treatment of ASB need to be incorporated as routine antenatal care for an integrated approach to safe motherhood and newborn health. On the basis of upshot of the study, it can be recommended that all women attending antenatal clinics should be subjected to urine culture at 20-24 weeks of gestation so that asymptomatic bacteriuria can be detected well in time and due precautions can be taken to reduce the maternal and neonatal morbidity and mortality.

CONCLUSION

Results implied the association of asymptomatic bacteriuria with preterm deliveries, low birth weight deliveries, preterm premature rupture of membranes and maternal complications like pyelonephritis. On the basis of upshot of the study, it can be recommended that all women attending antenatal clinics should be subjected to urine culture at 20-24 weeks of gestation so that asymptomatic bacteriuria can be detected well in time and due precautions can be taken to reduce the maternal and neonatal morbidity and mortality. Inspection for bacteriuria in pregnancy and suitable treatment be supposed to take into account as vital component of antenatal care to check impediment due to asymptomatic bacteriuria.

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