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Original Research

Study Of Asymptomatic Bacteriuria And Its Obstetrics And Perinatal Outcomes After Treatment In Early Vs Late Pregnancy In Tertiary Care Hospital

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ABSTRACT

OBJECTIVES

- To compare obstetric outcomes in women detected and treated for ASB in early pregnancy with those detected and treated late in pregnancy
- To compare perinatal outcomes in women detected and treated for ASB in early pregnancy with those detected and treated late in pregnancy.

MATERIAL & METHODOLOGY: This prospective observational cohort study was conducted at Shri Maharaja Gulab Singh Hospital, Jammu over a period of one year from 1st November 2019 to 31st October 2020. Group A comprised of 100 asymptomatic pregnant women till 20 weeks and group B comprised of 100 patients between 32-34 weeks. Midstream urine samples were obtained and were sent for culture and sensitivity. Women from both the groups having ASB on the basis of urine culture report were treated as per antibiotic sensitivity for 7 days. All patients were followed up in antenatal clinic till delivery and obstetric and perinatal outcomes were observed till 7 days.

RESULTS: Comparing the maternal outcomes in both the groups PTL was 27% in group A and 10% in group B with odds ratio of 3.32 with p value=0.001. PROM occurred in 6% in group B whereas no case was seen in group A. Odds ratio is 12.77 and 95% CI lies between 0.69-230.5. PPROM occurred in 8% of cases in group B and no case in Group A with p-value= 0.008. Odds ratio is 17.3 with 95% CI ranging between 0.98-305.5. These were significantly associated whereas anemia in group A was 28% and 22% in group B with odds ratio of 1.37 with p value = 0.32, gestational HTN in group A and Group B are 16% and 10% respectively with 1.71 odds ratio with p value = 0.2 and pyrexia in group A is 3% and no case in group B had no significant association in both the groups. Comparing fetal outcomes in group A and Group B. IUGR in fetuses were found in 12% in group B whereas 4% in group A. Odds ratio is 3.27 with significant association with p value=0.03 and 95% CI lies between 1.012-10.52. LBW was found in 9% and 34% cases in groups A and B respectively with odds ratio of 5.2 and highly significant association. NICU admissions were significantly reduced. Around 10% were admitted in group A and 28% in group B with odds ratio of 3.5 with p value =0.0017 which was significantly associated.

CONCLUSION: This study concluded that PTL, PROM and PPROM and FGR, LBW and NICU admissions were significantly reduced with early detection and treatment of ASB in pregnancy.

KEYWORDS: ASB, PTL, PROM, PPROM, IUGR, NICU

INTRODUCTION

Urinary tract infection is the most common medical complication during pregnancy and developing countries have higher rates of bacteriuria than in developed nations [3]. Although the incidence of bacteriuria in pregnant women is only slightly higher than non-pregnant women its consequences for both mother and the unborn child are severe[11]. There is much higher progression to pyelonephritis (40%) and an increased incidence of preeclampsia, premature birth and low neonatal birth weight [13].

Pregnancy causes profound structural and functional urinary tract changes. In 80% there is dilation of urinary tract, reduction in smooth muscle tone with slowing of ureteral peristalsis due to circulating progesterone. Uterus enlarges and compresses the

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urinary bladder, increasing vesico-ureteral reflux and urinary retention in bladder after micturition. Urinary stasis and impairment of anti-reflux mechanism causes favourable condition for bacterial growth. [13]

UTIs are classified as

- Asymptomatic bacteriuria (prevalence 2% -10%)
- Symptomatic infections
- Acute cystitis (1-4%)
- Acute pyelonephritis (0.5-2%) [13]

Asymptomatic bacteriuria is defined as persistent, actively multiplying bacteria of more than or equal to 10^5 colony forming units per ml of urine without any symptom of urinary tract infection [2]. Incidence during pregnancy varies from 2-10% [23].

Maternal consequences of bacteriuria in pregnancy[22]

preterm labour (<37 weeks of gestation): It is postulated that micro-organisms produce mediators of inflammation e.g. phospholipase A_2, prostaglandins causing cervical softening and increase in free calcium causing uterine contractions. Beta-hemolysin may be responsible for Group-B streptococcus related preterm delivery.[20]

gestational hypertension/ pre-eclampsia: Some authors hypothesize that urinary tract infections in childhood leads to renal scarring which may be asymptomatic during childhood consequently becoming symptomatic during pregnancy [12]. This hypothesis is supported by histopathological findings of focal glomerulosclerosis in children who suffered from UTIs and same findings were observed in women with pre-eclampsia [16].

Anaemia: caused by mediators of inflammation [20]

chorioamnionitis: Group B streptococcus cytolysin acts on epithelial cells causing pore formation in the placenta-foetal barrier [9].

symptomatic cystitis (30%)[7]

Pyelonephritis (50%) [7]

preterm premature rupture of membranes [7]

puerperal sepsis[7]

Perinatal consequences of bacteriuria in pregnancy are low birth weight(<2.5kg), prematurity (<37 weeks of gestation), preterm low birth weight, fetal growth restriction and neonatal septicaemia[7].

UTI in pregnancy is a risk factor for adverse outcomes that endangers the health of both mother and fetus. ASB screening and treatment encourages maternal and child health and part of package of infection preventing strategies to reduce pregnancy complications.

MATERIAL AND METHODS

This prospective observational cohort study was conducted at Shri Maharaja Gulab Singh Hospital, Jammu, Jammu and Kashmir, India over a period of one year from 1st November 2019 to 31st October 2020 after getting approval from institutional ethical committee.

100 asymptomatic pregnant women till 20 weeks (group A) and 100 between 32-34 weeks (group B) as determined by last menstrual period or ultrasound scan, irrespective of parity with singleton pregnancies coming to OPD of hospital for antenatal checkup were included.

Pregnant women having history of intake of antibiotics, symptomatic UTI, vaginal bleeding, fever with chills, suprapubic pain, multiple pregnancy, history of preterm delivery, preterm premature rupture of membranes, IUGR, gestational hypertension in previous pregnancy and diabetes were excluded.

All the subjects were informed about the study and informed consent was taken.

Detailed history was recorded including maternal age, gravidity, parity, age of gestation along with past medical and obstetric history, previous antibiotic intake, previous history of urinary tract infection, personal and family history of hypertension/preeclampsia and diabetes. History of deliveries before 37 completed weeks and birth weight less than 2.5 kg at term and NICU admissions were noted. Baseline investigations e g. hemoglobin levels, urine for albumin and sugar, random blood sugar, blood urea, urine routine examination and urine culture and sensitivity were done.

A midstream specimen of urine was obtained from the women and were sent for culture and sensitivity within 2 hrs of collection. Culture of micro-organisms was done on CLED medium/Mac conkey agar and blood agar using standard loop (semi-quantitative method).Plates were read after 24 hrs of aerobic incubation at 37^0C, then incubated for another 24 hr before a negative report was issued.

A sample with single organism obtained in counts $\geq 10^5$cfu /ml was taken as positive. Sensitivity testing was done using drugs safe in pregnancy by Kirby bauer method. Antibiotic sensitivity was done to identify the antibiotics for which the organism is susceptible or resistant. Women from both the groups diagnosed of having ASB on the basis of urine culture report were treated as per antibiotic sensitivity for 7 days. Clearance of bacteriuria was documented after the therapy was completed. All women in whom infection persisted were given a repeat course of antibiotics as per sensitivity report and clearance of infection was documented. All patients were followed up in antenatal clinic till delivery and obstetric and perinatal outcomes were observed till 7 days.

The data was analyzed using computer software Microsoft Excel and SPSS version 21.0 for windows. The chi-squared test was used to analyze the data. p-value<0.05 was considered statistically significant.

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RESULTS

Table I: Comparison Of Maternal Outcome In Two Groups

MATERNAL COMPLICATION	CATEGORY	%	ODDS RATIO	95% CI	p-value
ANEMIA	B vs A	28 vs 22	1.37	0.72-2.62	0.32
GEST. HTN	B vs A	16 vs 10	1.71	0.73- 3.98	0.2
PTL	B vs A	27 vs 10	3.32	1.51 - 7.32	0.001
PROM	B vs A	6 vs 0	12.77	0.69 - 230.5	0.027
PPROM	B vs A	8 vs 0	17.3	0.98 - 305.5	0.008
PYREXIA	B vs A	3 vs 0	6.155	0.30 – 124.5	0.17

Table I illustrates association of maternal outcomes in early vs late detection and treatment of ASB. Anemia in group A is 28% and 22% in group B with odds ratio of 1.37 with p value = 0.32 which is not significantly associated. Gestational HTN in group A and Group B are 16% and 10% respectively with 1.71 odds ratio with p value = 0.2 which is not significantly associated. PTL is 27% in group A and 10% in group B with odds ratio of 3.32 with p value =0.001 which is significantly associated Similarly PROM and PPROM are significantly associated with p values =0.027 and 0.008 respectively. Pyrexia in group A is 3% and no case in group B.

Fig I: Bar Diagram Showing The Percentage Of Patients According To Maternal Complications In The Two Groups.

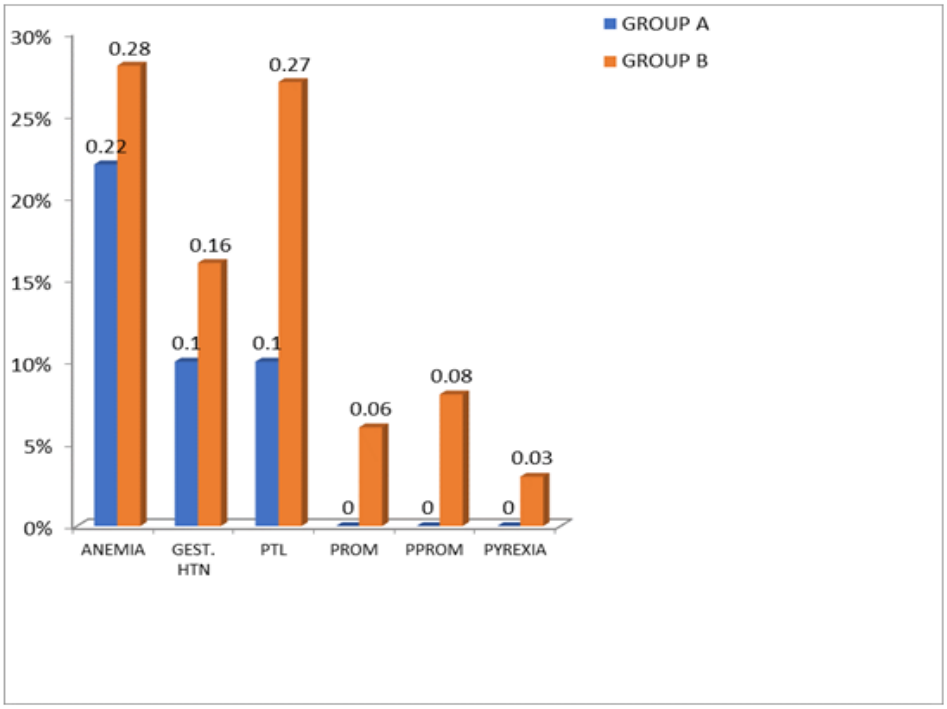

Table II: Comparison OfFetal Outcome In The Two Groups

FETAL OUTCOME	CATEGORY	%	ODDS RATIO	95% CI	p-value
FGR	B vs A	12 vs 4	3.27	1.012 – 10.52	0.03
LBW	B vs A	34 vs 9	5.2	2.34 - 11.59	0.0001
NICU	B vs A	28 vs 10	3.5	1.59 - 7.67	0.0017

Table II compares fetal outcomes in group A and Group B. FGR in fetuses were found in 12% in group B whereas 4% in group A. Odds ratio is 3.27 with significant association with p value=0.03 and 95% CI lies between 1.012-10.52. LBW was found in 9% and 34% cases in groups A and B respectively with odds ratio of 5.2 and highly significant association. NICU admissions were significantly reduced. Around 10% were admitted in group A and 28% in group B with odds ratio of 3.5 with p value =0.0017 which is significantly associated.

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Fig II: Bar Diagram Showing Fetal Outcomes In The Two Groups.

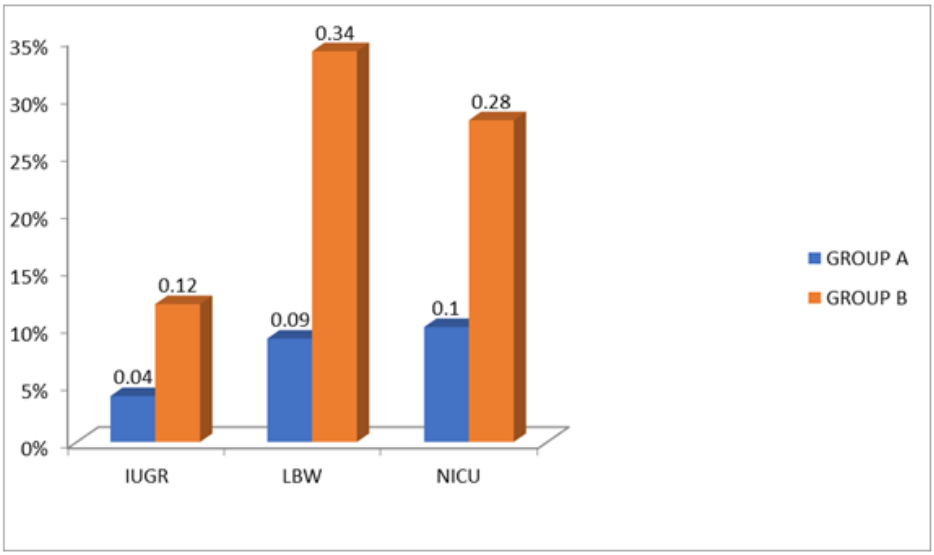


Fig III: Bar Diagram Comparing The Distribution Of Pregnant Women According To Weight Of The Newborn.

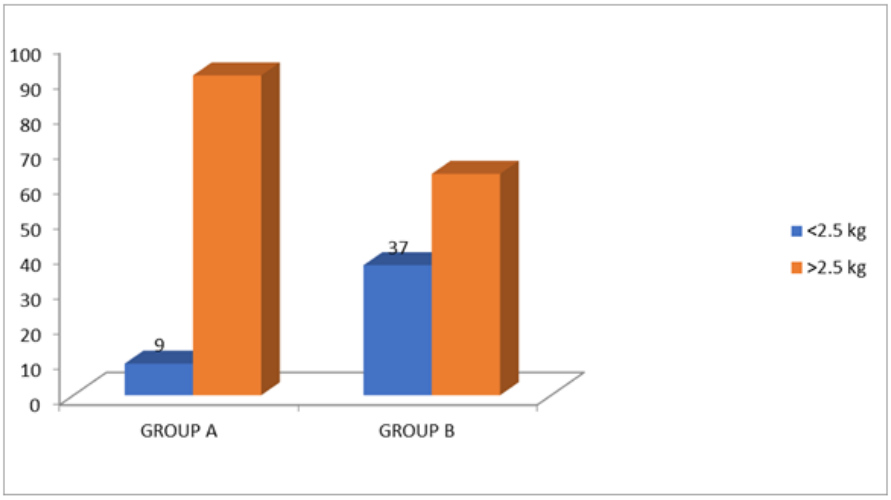
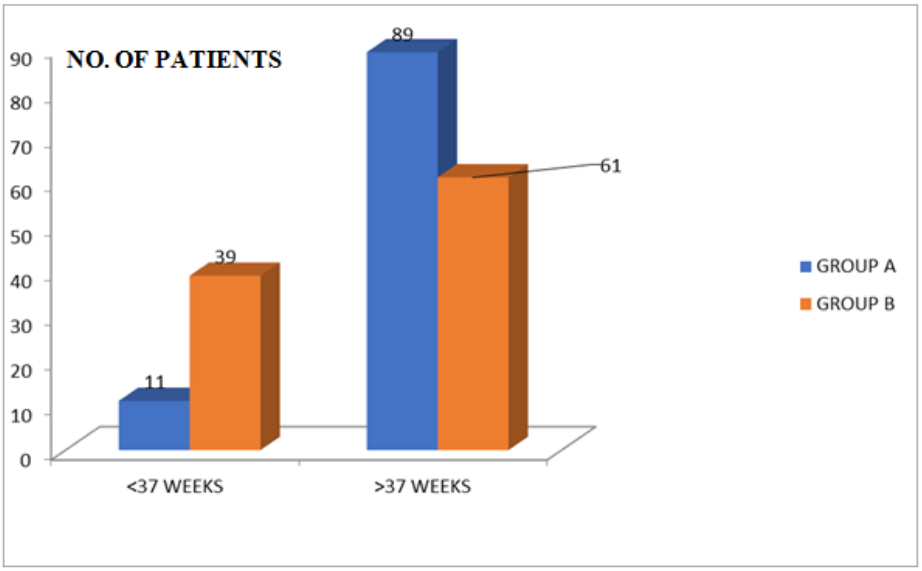


Fig IV: Bar Diagram Showing Distribution Of Pregnant Women According To Gestational Age At The Time Of Delivery In The Two Groups



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DISCUSSION

This study was conducted at the S.M.G.S Hospital in the department of Obstetrics and Gynecology on OPD patients to compare statistical significance of ASB screening and treatment of mother and its impact on both mother and child in early detected vs late detected groups. ASB is known to be associated with anemia, IUGR, PTL, Hypertensive disorders of pregnancy, PROM, PPROM and LBW infants. These risks get reduced by 70-80% if bacteriuria is eradicated. ASB causes maternal and fetal complications but early versus late detection, treatment and its impact on these complications remain an area of debate.

Anemia was seen in around 28% women in group B and around 22% in group A. Occurrence of anemia is high in both the groups and hence statistically not significant. Odds ratio is 1.37 and 95% CI is 0.72-2.62. Reason attributed to this is that anemia has high prevalence in our country and there are several etiological factors causing anemia not studied here leading to high prevalence in both the groups.

Gestational Hypertension developed in around 16% of group B and 10% of group A which is statistically non- significant. In contrast to the study conducted by Rezavand N et al[21] which concluded that bacteriuria was significantly more common in pre-eclampsia group than in control group. The rate of asymptomatic bacteriuria was 6.8 times higher in women with pre-eclampsia. Reason for deviation from this study could be since most of our study sample was from rural area where age of conception is lower and higher risk of developing gestational hypertension and preeclampsia and lower sample size. Therefore, further correlation needs to be studied in this aspect.

Preterm labor is around 27% in group B and around 10% in group A. Odds ratio is 3.32 and 95% CI lies between 1.51-7.32. Lai YJ *et al* [10] studied association of asymptomatic pyuria with PTL, PPROM and LBW which supports our study whereas Kazemier BM et al [8] concluded that in women with an uncomplicated singleton pregnancy, asymptomatic bacteriuria is not associated with preterm birth. This is in contrast to the present study. Possible explanation could be inability to rule out factors contributing to the activation of myometrium e.g. maternal or fetal stress, infections or other confounders like low BMI, poor nutrition etc were not studied which attribute to PTL more in group B this could be due to the smaller sample size.

PROM occurred in 6% in group B whereas no case was seen in group A which is statistically quite significant, clearly implying the importance of early detection and treatment of ASB in pregnant patients. Odds ratio is 12.77 and 95% CI lies between 0.69-230.5.

PPROM occurred in 8% of cases detected late compared to the early detected group i.e. group A where no case was seen. Though the sample size in our study is less it needs to be further studied. However it is statistically significant here with p-value= 0.008. Odds ratio is 17.3 with 95% CI ranging between 0.98-305.5.

Pyrexia occurred in 3% in group B whereas no case in group A. Since this study was conducted during covid pandemic, patients were discharged at the earliest to prevent the spread of infection. Therefore, following patients to study the complications e.g. development of pyelonephritis, cystitis and UTI was difficult in postpartum period. However, it was non-significant association in my study. Odds ratio is 6.155 and 95% CI lies between 0.30-124.5.

Comparing fetal outcomes in both the groups

FGR found in 12% of group B compared to 4% cases in group A which is statistically significant. Odds ratio is 3.27 and 95% CI lies between 1.012-10.52. Hantush-Zadeh S et al[5] also found that maternal urinary infection in the first trimester of pregnancy are associated with fetal growth restriction.

LBW found in 34% group B whereas only 9% in case of group A. Thus, it is highly significant, endorsing the benefits of early detection and treatment. Odds ratio is 5.2 with 95% CI between 2.34-11.59.

Similarly, NICU admissions were around 28% in group B and 10% in group A. Odds ratio 3.5 and 95% CI between1.59-7.67. Its association is highly significant in this study. Lai YJ et al[10] studied association of asymptomatic pyuria with preterm delivery before 36 weeks of pregnancy, preterm premature rupture of membrane, and low birth weight which supports the present study.

Guntoory I *et al* [4] found no statistically significant maternofetal outcome between early detected and bacteriuric negative group. Women of late detected group had greater odds of developing PTL, LBW,IUGR and NICU admissions which was statistically significant endorsing our study.

Further distribution of pregnant women according to gestational age at the time of delivery illustrates that group A had only 11% of delivery at <37weeks therefore depicting benefit of early detection and treatment of ASB routinely for better fetal outcome. However, a large percentage of 39%women delivered preterm in group B, contributing to high burden of prematurity in our country.

Mean gestational age at delivery in group A is 38.6 weeks and 37.7 weeks in group B. Therefore, detection and treatment helps in augmenting mean gestational age at delivery which is statistically significant.

Comparing distribution of pregnant women according to birth weights of newborns depicts that only around 9% of pregnant women had birth weight of new born <2.5kg in group A whereas 37% in group B which is quite significant. Mean birth weight was 2.82±0.49kg and 2.66±0.54kg in respective groups. Lamba I *et al* [11] conducted a prospective cohort study where 64.86% women in late detected group gave birth to babies<2500gm while 18.82% in ASB negative group.

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CONCLUSION

Comparing maternal outcomes, our study concluded that PTL, PROM and PPROM could be prevented if ASB was detected and treated early in pregnancy whereas anemia, gestational HTN and pyrexia due to chorioamnionitis or pyelonephritis were not significantly associated. Comparing fetal outcomes FGR, LBW and increased NICU admissions were significantly associated with ASB detected late and benefits of late treatment were not elucidated whereas detection and treatment of ASB early in pregnancy were beneficial for the fetus. Present study endorses the importance of screening and treating ASB early in pregnancy to avoid adverse outcomes.

Limitation of this study is since this study was conducted during covid pandemic; patients were discharged at the earliest to prevent the spread of infection. Therefore, follow up of patients to study the complications was difficult in postpartum period and small sample size.

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Conflict of interest: The authors declare that there is no conflict of interest

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