

Original Article

Prevalence of Vaginitis in Preterm Labour and Its Effect on Fetomaternal Outcome

Vaishali Verma¹, Sunaina Singla², Banashree Das³, Anita Chakravarty⁴

Abstract

Background : Preterm Labour (PTL) complicates about 10% to 15% of all pregnancies and is the most common cause of perinatal morbidity and mortality. Genital Tract Infection is one of the most common causes which is responsible for Preterm labour. physiological changes such as pH values during pregnancy affect the vaginal mucosa leading to congestion and hypertrophy. Deranged pH value helps in growth of anaerobic bacteria and other pathogenic microorganism. Vaginitis is thought to be associated with various pregnancy related complications, particularly an increased risk of preterm birth. Thus, this study aims to evaluate the prevalence of Vaginitis in Preterm Labour and its effect on fetomaternal outcome.

Materials and Methods : This prospective case control observational study included 40 patients in Study Group (Preterm labour) and 40 patients in Control Group (Term labour) who admitted in LR in established labour. Complete workup was done. Two Vaginal swabs were taken, first for Gram staining and wet mount preparation for detection of clue cells and KOH test (Whiff test) while the second swab was for culture. Outcome of the pregnancy was assessed, and patient was managed as per standard protocol.

Result : The prevalence of Vaginitis was 37.5% and 27.5% in study (Preterm) and control (Term) group respectively. In the study group 15 women had Vaginitis, out of which Candida (33.33%), Aerobic Vaginitis (33.33%), followed by Bacterial Vaginosis (26.67%) and group B-streptococcus (6.67%). BV and GBS was not present in the control group. Thus more complications were seen preterm group. In preterm group, 26.66% of neonatal mortality occurred in neonates born vaginitis positive mothers.

Conclusion : Prevalence of Vaginitis in both the groups is similar but the type of Vaginitis differs in both the groups. Diagnosing the type of Vaginitis and prompt treatment has more significance in prevention of preterm labour.

Key words : Preterm Labour, Vaginitis, Group-B Streptococcus, Chorioamnionitis.

Preterm Labour (PTL) is defined as the onset of the labour before the 37th completed weeks of gestation. It complicates about 10% to 15% of all pregnancies and is the most common cause of perinatal morbidity and mortality. Preterm delivery affects 1 in 10 births (11%) in USA and even greater births in developing countries and causes 40% to 75% neonatal deaths¹.

The causes of PTL could be maternal, fetal, placental or idiopathic. These can be categorized into four groups. (a) Medical and Obstetric complication like hypertension in pregnancy, multiple pregnancy, placental haemorrhage, uterine anomalies. They are responsible for about one third cases of all PTL

Department of Obstetrics and Gynecology, Faculty of Medical and Health Sciences, SGT University, Gurugram, Haryana 122505

¹MBBS, MS, Senior Resident and Corresponding Author

²MBBS, MS, Senior Resident

³MBBS, MS, Professor

⁴MBBS, MS, Professor, Department of Microbiology

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Editor's Comment :

- Pregnant women are more prone to vaginal microorganism colonization due to hormonal changes. Vaginitis affects maternal and perinatal outcomes.
- Pregnant women should be screened for early detection and treatment.

(b) Fetal factors like intrauterine growth restriction, congenital anomaly of fetus. (c) Amniotic fluid infection leading to Chorioamnionitis by a variety of microorganism located in the genital tract. Approximately one third of preterm births are associated with chorioamniotic infection and (d) Idiopathic.

Out of the several causes, Genital Tract Infection is one of the most common causes which is responsible for Preterm labour. During pregnancy there is alteration in oestrogen and progesterone levels which is responsible for physiological changes such as change of pH values in the lower genital tract. Such changes affect the vaginal mucosa leading to congestion and hypertrophy. Deranged pH value helps

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in growth of anaerobic bacteria and other pathogenic microorganism within the vagina. Vaginitis is thought to be associated with various complications of pregnancy, particularly an increased risk of Preterm birth².

The most common vaginal infection in pregnancy is Bacterial Vaginosis (BV), Candidiasis and Trichomoniasis.

In the normal vaginal flora, the anaerobe to aerobe ratio is between 2:1 and 5:1. In the presence of Bacterial Vaginosis, the quantity and quality of H₂O₂ producing lactobacilli decrease, the vaginal pH increases and there is a subsequent shift in the anaerobe to aerobe ratio to between 100:1 and 1000:1.

Various studies have implicated Vaginitis during pregnancy as the cause of spontaneous abortion, Preterm labour, Premature rupture of membrane, Chorioamnionitis.

Keeping these facts in mind this study was proposed to assess the prevalence of Vaginitis in women presenting with Preterm labour in this Institute which is in Rural Haryana and also to find out the effect of Vaginitis in maternal and fetal outcome.

MATERIAL AND METHODS

This prospective case control observational study was conducted in the Department of Obstetrics and Gynaecology, in Medical College in rural Haryana after Ethical Committee permission.

The present study aimed to assess prevalence of Vaginitis in the Preterm labour and Term labour, compare it and to evaluate the fetomaternal outcomes. We included 40 patients in Study Group (Preterm labour) and 40 patients in Control Group (Term labour) who were admitted to the labour room of the Department of Obstetrics & Gynaecology and fulfilled the inclusion criteria and willing to participate in the study.

Inclusion criteria: All pregnant women established in labor before 36+6 weeks were included in "Study Group" and all the pregnant women with established labor in gestational age more than 37 weeks were included in "Control group".

Exclusion criteria: pregnant women with Multiple Gestation, Polyhydramnios, Structural Uterine Abnormalities, Antepartum Haemorrhage, Pregnant

Women with Intrauterine death, Pregnancies complicated with medical disorders like Hypertension, Diabetes Mellitus, Chronic Renal Disorders, Gastrointestinal Disorders, Severe Cardiac Disorders etc, and those who were not willing to participate in the study.

Complete workup was done including history, thorough physical examination and all antenatal investigations and other relevant investigations were reviewed and recorded as per standard protocol. After complete obstetrical examination, specimens were collected for diagnosis of Vaginitis.

Two Vaginal swabs was taken and sent to the Laboratory of Department of Microbiology. The first vaginal swab was used to prepare a smear on a slide for Gram staining and also used for wet mount preparation for the detection of clue cells and KOH test (Whiff test) while the second vaginal swab was used specifically for culture and results were noted. After taking specimen for diagnosis of Vaginitis patient were managed as per standard protocol for management of Preterm and Term labour. Following delivery patients and neonates were observed for at least 72 hours. Mother was monitored for detection of puerperal infection after 24 hours. All data were recorded in pre-set Performa and analysed.

BV diagnosis was done by means of microscopic examination of Gram-stained vaginal smear slides. The Gram-stained slides were then examined microscopically by a qualified laboratory personnel for BV diagnosis, using the Nugent's criteria scoring system.

Wet mount was examined under a high power for the presence of epithelial cells, clue cells, pus cells, Trichomonas vaginalis and Candida.

Whiff test was performed by adding 2 to 3 drops of 10% KOH to the vaginal discharge on the speculum and sniffing the mixture. The test is interpreted as positive if a fishy aroma is noted.

The second swab which was placed in the transport medium was inoculated on blood agar, Chocolate agar and Sabouraud dextrose agar and incubated at a temperature range of 35-37°C for 18 to 24 hours. Organisms that grew on the culture media were identified using their colonial morphology, Gram stain and biochemical reactions.

After taking specimen for diagnosis of Vaginitis patient were managed as per standard protocol for

management of Preterm and Term labour.

Outcome of the pregnancy was assessed for obstetric and fetal outcome.

Obstetric outcome : Assessed for mode of delivery, Associated obstetric complications, Intrapartum complications, Postpartum complications.

Neonatal outcome : recorded live/still birth, APGAR at 1 and 5 min, Birth weight, neonatal complications, Neonatal Intensive Care Unit (NICU) admissions, Neonatal mortality.

Statistical Analysis :

Association of infection diagnosed using each criterion in Preterm and Term delivery were estimated by Fisher's exact t-test and qualitative data were compared using chi-square test. Statistical significance was considered when p value was less than 0.05.

RESULT

In present study majority of the patients were between 21 to 25 years. The mean age in both Study and Control group was not statistically significant with p value of 0.084. The mean age was comparable in both the groups.

Majority of the patients in Study Group (52.5%) delivered between 34 to 36 completed weeks of gestation and only (7.5%) delivered before 28 weeks of gestation. In Control group, Majority of the patients (62.5%) were delivered between 37 to 38 weeks+6 days of gestation and (37.5%) were delivered 39 to 40 weeks+6 days of gestation.

The prevalence of Vaginitis was 37.5% and 27.5% in Study (preterm) and Control (term) group respectively.

Out of the 15 women who had Vaginitis in the Study group, six (40%) delivered between 34 to 36 completed weeks, five (33.33%) delivered between 32 to 34 completed weeks, two (13.33%) delivered between 28 to 32 completed weeks and the remaining two (13.33%) delivered in the gestational period below 28 weeks. In Control group 11 women who had

vaginitis, nine (81.81%) delivered between 37 to 40 weeks and two (18.18%) delivered after 40 weeks.

The commonest infections found in this study were Candida (33.33%), Aerobic Vaginitis (33.33%), followed by Bacterial Vaginosis (26.67%) and group B-streptococcus (6.67%) in Preterm group and Candida 18.18% followed by Aerobic Vaginitis 81.82% in Term group.

On analysing the type of Vaginitis in Study and Control group it was observed that Bacterial Vaginosis (26.67%) and Group B streptococcus (6.67%) was present only in study group but not in the Control group.

In the Study group, 50% women with BV had Prelabour Preterm Rupture of Membrane (PPROM) whereas 20% with Candida had PPROM. The frequency of Preterm Premature 'rupture of Membranes was significantly higher in Study group with p-value 0.005 as compared to Control group (Table 1).

All women with Group-B Streptococcus positive had Chorioamnionitis infection and puerperal pyrexia and neonatal septicaemia as compared to other types of Vaginitis.

25% of women with BV had Chorioamnionitis, puerperal pyrexia and atonic PPH postpartum complications. 20% patients with Candida Vaginitis had Chorioamnionitis. One patient who had Group-B streptococcus also had Chorioamnionitis.

In Present study (Preterm group) 26.66% of neonatal mortality occurred were born to vaginitis positive mothers compared to 4% of neonatal mortality born to Vaginitis negative mothers and there was no neonatal mortality in Control group.

In Preterm Group 86.66% of neonates born to mother with Vaginitis had low birth weight as compared to 48% of neonates born to mother without Vaginitis. This difference was statistically significant (p=0.014). There was no low-birth-weight baby born in Control group with Positive Vaginitis mothers (Tables 2&3).

Table 1 — Maternal outcome in Relation to Type of Vaginitis in Study Group

Outcome	No Pathogen n=25 (%)	Bacterial Vaginosis N=4* (%)	Candida N=5 (%)	Group-B Strepto- coccus N=1 (%)	Trichomonas N=0 (%)	Aerobic Vaginitis N=5 (%)	X ²	p- value
PPROM	6(24%)	2(50%)	1(20%)	0(0%)	0(0%)	0(0%)	14.77	0.005(S)
Chorioamin otis	2(8%)	1(25%)	1(20%)	1(100%)	0(0%)	1(25%)	15.69	0.003(S)
Puerpural pyrexia	0(0%)	1(25%)	0(0%)	1(100%)	0(0%)	1(25%)	30.08	0.001 (S)
Atonic PPH	1(4%)	1(25%)	1(20%)	0(0%)	0(0%)	0(0%)	9.64	0.05(S)

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Table 2 — Neonatal outcomes in Relation to Vaginitis in Study and Control the Groups

Outcome	Study Group Vaginitis positive n=15%	Control Group Vaginitis positive n=11%
LBW	86.66	-
Still birth	-	-
Neonatal death	26.66	-
NICU Admission	86.46	27.27
Neonatal Jaundice	33.33	-
RDS	20	-
PDA	6.66	-
Hypoglycemia	6.66	-
Septicemia	13.33	9.09
Hypocalcemia	6.66	-

DISCUSSION

Pregnant women have a twofold increase in the prevalence of vaginal microorganisms' colonization compared to non-pregnant women. Increased levels of circulating oestrogen and deposition of glycogen and other substrates in the vagina during pregnancy influence this association³.

In the present study the mean maternal age in both the groups was comparable (23.5 years and 24.6 years in Study group and Control group respectively). Study done by Kavya K, *et al* had a mean maternal age of 25.6 and 25.3 years respectively⁴. This can be explained by the fact that age of marriage is comparatively low in North India.

In our study prevalence of Vaginitis was 37.5% in the Study (Preterm) group and 27.5% in Control (Term) group. Though prevalence was higher in the study group, but this difference was not statistically significant. According to a study by Rathod S, *et al* in 2016 from Karnataka, who conducted the study on 920 pregnant women, only 80 (8.7%) had Vaginitis which is much less than the present study. Study

population in that study was much higher than the present study. Yarlagogadda S, *et al* (2018) from Andhra Pradesh India, reported incidence of vaginal infections to be 33.62%.⁵ Their finding is similar to our result.

In the present study total number of patients with Vaginitis was slightly more in Study (Preterm) group than in Control (Term) group (37.5% and 27.5%).%. Kavya K, *et al* (2019) from Karnataka reported prevalence of Vaginitis to be much higher in preterm group as compared to Term group (22% and 6% respectively)³.

The commonest infections found in this Study group were Candida (33.33%), Aerobic Vaginitis (33.33%), Bacterial vaginosis (26.67%) and Group B-streptococcus (6.67%) whereas in the Control group most common infection found was Aerobic Vaginitis (81.82%) followed by Candida (18.18%). Benchetrit, *et al* reported a very high incidence of GBS in their study (26%) as compared to present study⁶.

On analysing type of Vaginitis in study and control group it was observed that Bacterial Vaginosis (26.67%) and Group B streptococcus (6.67%) was present only in Study group but not present in the Control group. Similar to the present study, Kiran CK, *et al* (2017) also reported that Group B Streptococcus was only present in the Preterm labour but not present with Term labour. This shows that Group B streptococcus infection may be a cause of preterm labour⁷.

In present study prevalence of Candida vaginitis was higher (33.33%) in Preterm group than the Control group (18.18%) but it was not statistically significant (p value of 0.66). Kiran CK, *et al* (2017) also reported a greater number of cases of Candida positive (8.0%) in Preterm group as compared to (6.0%) in Term group.

Table 3 — Neonatal outcomes in relation to different types of Vaginitis in Study group and Control group

Outcome	No pathogen		Candida		Bacterial Vaginosis		Group B strepto- coccus		Trichomonas		Aerobic Vaginitis	
	Study group	Control group	Study group	Control group	Study group	Control group	Study group	Control group	Study group	Control group	Study group	Control group
LBW	12	3	4	nil	4	nil	1	nil	nil	nil	4	nil
Still birth	1	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
Neonatal death	nil	nil	1	nil	1	nil	1	nil	nil	nil	1	nil
NICU Admission	16	6	4	nil	3	nil	1	nil	nil	nil	4	3
Neonatal Jaundice	12	3	3	nil	1	nil	nil	nil	nil	nil	1	nil
RDS	5	nil	1	nil	1	nil	nil	nil	nil	nil	1	nil
PDA	1	nil	1	nil	nil	nil	nil	nil	nil	nil	0	nil
Hypoglycemia	1	nil	nil	nil	nil	nil	nil	nil	nil	nil	1	nil
Septicemia	1	nil	1	nil	nil	nil	1	nil	nil	nil	nil	1
Hypocalcemia	2	nil	nil	nil	1	nil	nil	nil	nil	nil	nil	nil

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In present study prevalence of Aerobic Vaginitis (81.82%) was much higher in the Control group as compared to the Study group and this was statistically significant. On contrary study published by Sima Gity, *et al* (2011) only E coli infection was significantly higher (11.20% versus 1.61% with p value 0.002) in the pre-term group as compared to term group⁸.

On analysing it was found that type of Vaginitis and earlier the Vaginitis in gestational age had significant adverse maternal and perinatal outcome. Kurki, *et al* in their study observed that Bacterial Vaginosis in early pregnancy was associated with a 2.6-fold risk (95% CI 1.3-49) for Preterm labour, a 6.9-fold risk (95% CI 2.5 -18.8) for Preterm birth⁹.

In the present study, 50% of patients who had BV had PPROM which was highest as compared to other Vaginitis in the study group. Kurki, *et al* in their study found that Bacterial Vaginosis in early pregnancy was associated with a 7.3-fold risk for Preterm premature rupture of membranes (95% CI 1.8-29.4)⁹.

Bacterial Vaginosis mostly remains asymptomatic during pregnancy but it is often associated with Preterm labor, PPROM, PROM and subsequent maternal and fetal morbidity (Chorioamnionitis, Puerperal Sepsis, Endometritis, Low Birth Weight, Low Apgar Score in Neonate and Neonate Jaundice). In present study, 25% of women who had BV positive had Chorioamnionitis, Puerperal pyrexia and atonic PPH.

In the present study (Preterm group) 26.66% of neonatal mortality occurred in the neonate born to mothers' with Vaginitis as compared to 4% of neonatal mortality in women without Vaginitis and there were no neonatal mortality in the Control group. Rathod S, *et al* (2016) reported no significant correlation between neonatal mortality and Vaginitis (value less than 0.446)¹⁰.

In the Present study, in Preterm Group 86.66% of neonates born to Vaginitis positive mothers had low birth weight as compared to 48% of neonates born to Vaginitis negative mothers.

This difference was statistically significant (p=0.014). There were no low-birth-weight babies in Control group born to mothers with Vaginitis.

Greater number of neonates in Preterm group with Vaginitis needed NICU admission as compared to Term group with Vaginitis. This finding was statistically significant. (p=0.002).

From the present study it was observed that type of bacteria is more important for both maternal and perinatal complications. BV, GBS probably cause more Preterm labour and other complications than aerobic Vaginitis and Candidiasis.

CONCLUSION

In our study we found that, among rural pregnant women, prevalence of Vaginitis in both groups was similar but the type of Vaginitis differs in both the groups. Type of vaginitis and vaginal infection in earlier gestational age had significant adverse maternal and perinatal outcome. Bacterial Vaginosis and Group B streptococcus infection was present only in the preterm labour women and was significantly associated with Preterm delivery. Diagnosing the type of Vaginitis and prompt treatment has more significance in prevention of Preterm labour.

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