International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Masand D et al. Int J Reprod Contracept Obstet Gynecol. 2016 Feb;5(2):477-481
www.ijrcog.org

pISSN 2320-1770 | eISSN 2320-1789

DOI: http://dx.doi.org/10.18203/2320-1770.ijrcog20160394

Research Article

Study of prevalence of bacterial vaginosis in preterm and term labour

Deepa Masand, Deepshikha Melkani*

Department of Obstetrics & Gynaecology, NIMS Medical College & Hospital, Jaipur, Rajasthan, India

Received: 05 January 2016
Accepted: 23 January 2016

***Correspondence:**
Dr. Deepshikha Melkani,
E-mail: drjasmine21@gmail.com

ABSTRACT

Background: The objective of the study was to study the prevalence of bacterial vaginosis in women with preterm & term labour & to analyze the causal relationship of bacterial vaginosis with preterm labour.
Methods: An observational study conducted on 100 patients reporting at labour room in Obstetrics & Gynaecology department of NIMS Medical College & hospital, between November 2013 to June 2014 involving 50 patients with preterm & 50 with term labour.
Results: Patients who fulfilled Amsel's criteria and patients with discharge suggestive of bacterial vaginosis were significantly more in preterm labour group as compared to term labour group. Out of 50 patients in preterm labour group, 18(36%) were suggestive of bacterial vaginosis, 32(64%) were not suggestive of bacterial vaginosis. Out of 50 patients in term labour group, 4(8%) were suggestive of bacterial vaginosis, 46(92%) were not suggestive of bacterial vaginosis.
Conclusions: Bacterial vaginosis is major risk factor for preterm labour. Therefore, testing for bacterial vaginosis & prompt treatment may reduce risk of preterm labour.

Keywords: Bacterial vaginosis, Preterm labour, Term labour

INTRODUCTION

Preterm labor is defined as the onset of labor prior to 37 completed weeks of gestation i.e. 359 days from first day of last menstrual period. Preterm delivery affects 1 in 10 births (11%) in USA and even greater births in developing countries and causes 40-75% neonatal deaths.[1]

Preterm labour (PTL) and delivery are among the most challenging obstetric complications encountered. It complicates about 5-10% of all pregnancies and in about 30% it is due to deliberate medical intervention and in the remainder due to spontaneous PTL. PTL is associated with 75% of all perinatal deaths.[2]

The causes of PTL could be maternal, fetal, placental or idiopathic. It is known that, infection is one of the most important maternal factors responsible for preterm labor.[3] Ascending infections have been identified as the most important preventable cause of PTL. Amongst the ascending infections, bacterial vaginosis is a major cause of preterm labor.

Bacterial vaginosis is not a classical infection caused by a single pathogen, but is rather a complex alteration of the vaginal ecosystem, where the physiologic lactobacilli-dominant flora is replaced by an overgrowth of mixed flora, with a high concentration of anaerobic bacteria, normally present in the vagina in substantially fewer numbers.[4] The most common organisms include *Gardnerella vaginalis*, *Prevotella* spp., *Mycoplasma hominis*, and *Mobiluncus* spp.

In the normal vaginal ecosystem, the anaerobe to aerobe ratio is normally kept between 2:1 and 5:1. In the

presence of BV, 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.[4]

Spontaneous preterm labor is mostly found approximately 30-50% and bacterial vaginosis is one of the many causes of preterm labor. Pregnancy with bacterial vaginosis is a higher risk for preterm delivery.[5]

Intrauterine infection may occur early in pregnancy or even before pregnancy and remain asymptomatic and undetected for months until preterm labour or premature rupture of membranes (PROM) occurs.[6,7] It is a risk factor for preterm delivery, as well as being associated with peripartum complications such as preterm premature rupture of membranes (PPROM), chorioamnionitis, and postpartum endometritis.[7]

The aim and objectives of the study was to study the prevalence of bacterial vaginosis in women presenting with preterm labour and term labour and to analyse the causal relationship between bacterial vaginosis and preterm labour.

METHODS

An observational study was conducted in NIMS Medical College & Hospital from November 2013 to June 2014. The study was done in 100 subjects that 50 in each group. Pregnant women with preterm and term labour admitted to NIMS Medical College & hospital.

Informed consent was obtained. The gestational age was calculated from the first day of the last menstrual period and earliest available ultrasound scan.

Pelvic examination was performed. Using a sterile vaginal speculum, vaginal swab was collected from lower one-third of the vaginal wall. The vaginal swab was subjected to Gram staining. Vaginal discharge was taken for wet mount for detection of clue cells and KOH test (Whiff test). The pH of vaginal discharge was tested using litmus paper. Change in color was noted

The clinical diagnosis of BV is made in the presence of three of the following four signs first described by Amsel in 1983[8]:

1. The presence of an adherent and homogeneous vaginal discharge.
2. A vaginal pH >4.5.
3. Detection of clue cells (vaginal epithelial cells so covered by bacteria as to render the borders indistinct) on saline wet mount.
4. An amine odor (positive 'whiff test') after addition of the amine potassium hydroxide (10%) to the vaginal secretions.

Inclusion criteria

Preterm labour (group I)

- Gestational age less than 37 weeks
- Regular uterine contractions (four or more in 20 minutes or eight or more in 60 minutes), each lasting more than 40 seconds.
- Cervical dilatation equal to or greater than 1cm but less than 4cm and effacement equal to or greater than 80%
- Intact fetal membranes.

Term labour (group II)

- Gestational age >37 completed weeks
- Spontaneous in onset
- Regular uterine contractions (four or more in 20 minutes or eight or more in 60 minutes), each lasting more than 40 seconds.
- Cervical dilatation equal to or greater than 1cm but less than 4cm and effacement equal to or greater than 80%
- Intact fetal membranes.

Exclusion criteria

- Rh isoimmunisaton
- Ruptured membranes
- Use of antibiotics in the preceding two weeks
- Multiple gestation
- Structural uterine anomalies
- Established fetal anomalies
- Prior use of tocolytic agents during the current pregnancy
- Pregnancies complicated with medical disorders
- Patients who were not willing to give consent

RESULTS

Table 1: Mean age group of both the groups.

	Preterm labour (N=50)	Term labour (N=50)
Mean age (Mean ± SD) (Years)	25.60 ± 4.295	25.38 ± 4.010

The mean age was comparable in both the groups with p value of 0.792 (Table 1).

Table 2: Mean gestational age of patients at admission in both groups.

	Preterm labour (N=50)	Term labour (N=50)
Mean POG + SD (Weeks)	33.50 + 2.562	39.02 + 1.093

The mean gestational age at the time of admission in preterm labour group was 33.5 weeks whereas in term labour group was 39 weeks (Table 2).

Table 3: Previous history of sexually transmitted infections.

H/O STIs	Present N (%)	Absent N (%)
Preterm labour (N=50)	8 (16.0)	42 (84.0)
Term labour(N=50)	2 (4.0)	48 (96.0)
Total (N= 100)	10 (10.0)	90 (90.0)

P value= 0.0478 (significant)

The proportion of patients who had h/o STIs were significantly more in preterm labour group as compared to term labour group with a p value of 0.0478 (Table 3).

Table 4: Nature of discharges in both groups.

Type of discharge	Preterm labour (N=50)	Term labour (N=50)
No discharge	14 (28.0)	25 (50)
White mucoid discharge	12 (24.0)	19 (8.0)
White curdy discharge	10 (20.0)	4 (8.0)
Greyish white discharge	8 (16.0)	2 (4.0)
Grey frothy discharge	4 (8.0)	0 (0.0)
Greenish frothy discharge	2 (4.0)	0 (0.0)
Total (N=100)	50 (100.0)	50 (100.0)

p = 0.005 (highly significant)

Table 5: Discharge suggestive of bacterial vaginosis in both groups.

Discharge	Suggestive of bacterial vaginosis N (%)	Not suggestive of bacterial vaginosis N (%)	Total N (%)
Preterm labour (N=50)	18 (36%)	32 (64%)	50
Term labour (N=50)	4 (8%)	46 (92%)	50
Total (N= 100)	22 (22%)	78 (78%)	100

The proportion of patients with discharge suggestive of bacterial vaginosis was significantly more in preterm labour group as compared to term labour group with p value of 0.0008 (Table 5).

The proportion of patients who had basic vaginal pH was significantly more in preterm labour group as compared to term labour group with p value of 0.0002 (Table 6).

Table 6: Vaginal pH in both groups.

pH	Basic N (%)	Acidic N (%)	Total N (%)
Preterm labour (N=50)	23 (46%)	27 (54%)	50 (100)
Term labour (N=50)	6 (12%)	44 (88%)	50 (100)
Total (N= 100)	29 (29%)	71 (71%)	100 (100)

Table 7: Whiff test results in both groups.

Whiff test	Positive N (%)	Negative N (%)	Total N (%)
Preterm labour (N=50)	24 (48)	26 (52)	50 (100)
Term labour (N=50)	10 (20)	40 (80)	50 (100)
Total (N= 100)	34 (34)	66 (66)	100 (100)

The proportion of patients who had a positive whiff test was significantly more in preterm group as compared to term group (p=0.0016) (Table 7).

The proportion of patients who were diagnosed to have bacterial vaginosis according to Amsel's criteria was significantly more in preterm labour group than in term labour group, with a p value of 0.0008 (Table 8).

In preterm labour group 33.3% of patients who were BV positive had postpartum complications as compared to 21.8% of patients who were BV negative. This difference was not significant statistically (p=0.1876) (Table 9).

Table 8: Diagnosis of bacterial vaginosis according to Amsel's criteria in both groups.

Amsel's criteria	≥ 3 criteria N (%)	≤ 3 criteria N (%)	Total N (%)
Preterm labour (N=50)	18 (36)	32 (64)	50 (100)
Term labour (N=50)	4 (8)	46 (92)	50 (100)
Total (N= 100)	22 (22)	78 (78)	100 (100)

In term labour group none of the patients who were BV positive had post-partum complications, while 8.7% of patients who were BV negative had post-partum complications (p=0.2693) (Table 10).

Table 9: Postpartum complications among preterm labour group in bacterial vaginosis positive and negative patients.

Bacterial vaginosis	Postpartum complication present N (%)	Postpartum complications absent N (%)	Total
Positive (18)	6 (33.3)	12 (66.7)	18
Negative (32)	7 (21.8)	25 (78)	32

Table 10: Postpartum complications in term labour group in bacterial vaginosis positive and negative patients.

Bacterial vaginosis	Postpartum complication present N (%)	Postpartum complications absent N (%)	Total
Positive (4)	0 (0)	4 (100)	4
Negative (46)	4 (8.7)	42 (91.3)	46

DISCUSSION

In preterm labour group 16% of patients had previous history of sexually transmitted infections as compared to 4% in term labour group.

According to Gonclaves et al intrauterine infections are a major cause of preterm labor, with or without intact membranes and accounts for approximately 25% of cases.[9]

According to Cram et al asymptomatic bacteriurea, gonococcal cervicitis and bacterial vaginosis are strongly associated with preterm labor and the role of chlamydia, candida, trichomonas and urea plasma is less clear.[10]

A study confirmed that Bacterial vaginosis, early in pregnancy, is a strong risk factor for preterm delivery and spontaneous abortion.[11] Bacterial vaginosis increased the risk of preterm delivery >2-fold (odds ratio, 2.19; 95% CI, 1.54-3.12). Higher risks were calculated for subgroups of studies that screened for bacterial vaginosis at <16 weeks of gestation (odds ratio, 7.55; 95% CI, 1.80-31.65) or at <20 weeks of gestation (odds ratio, 4.20; 95% CI, 2.11-8.39).

Another study showed that the presence of bacterial vaginosis was related to preterm delivery of a low-birth-weight infant (odds ratio, 1.4; 95 percent confidence interval, 1.1 to 1.8).[12] Among women with bacterial vaginosis, the highest risk of preterm delivery of a low-birth-weight infant was found among those with both vaginal bacteroides and Mycoplasma hominis (odds ratio, 2.1; 95 percent confidence interval, 1.5 to 3.0).

A similar study done by Agarwal et al. also showed sensitivity and specificity of clue cells to be 100%.[13] Amsel's criteria detected bacterial vaginosis in 40.5% of patients with a sensitivity and specificity of 69.0 and 93.1%, respectively which is comparable to the study done by Dadhwal et al who showed the sensitivity and specificity of Amsel's criteria as 51.2 and 98%, respectively.[14]

Ugwumadu et al. showed that the treatment of asymptomatic intermediate abnormal vaginal flora and BV in a general obstetric population reduces the occurrence of late miscarriage and spontaneous preterm labour and preterm birth.[15]

CONCLUSIONS

It was observed that in preterm group significantly more number of patients had previous history of sexually transmitted infections as compared to term group.

The number of patients who fulfilled Amsel's criteria for diagnosis of bacterial vaginosis was significantly more in preterm labour group.

Thus from the present study it is concluded that bacterial vaginosis plays a significant role in causation of preterm labour.

Proper hygiene, early diagnosis of bacterial vaginosis and its prompt treatment may therefore reduce the risk of preterm labour.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Masand D, Melkani D. Study of prevalence of bacterial vaginosis in preterm and term labour. Int J Reprod Contracept Obstet Gynecol 2016;5:477-81.