Bacterial Vaginosis in Preterm and Term Labour: A hospital based cross sectional analytical study

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Abstract
Background :Bacterial vaginosis is a polymicrobial disorder characterized by decrease in the number of H2O2 producing lactobacillus and overgrowth of several facultative anaerobic bacteria like Gardnerella vaginalis, Haemophillus vaginalis, Mycoplasma, or anaerobes like Bacteriods sp, Prevotella sp and Mobiluncus sp.
Objective: To determine the prevalence of bacterial vaginosis in women presenting with preterm labour and term labour and determine any association between bacterial vaginosis and preterm labour. Material and Methods: A cross sectional analytical study
study carried out over a period of 6 months on the patients admitted and delivered at our MDM & Umaid hospital, Department of obstetrics and gynecology, Dr. S.N. Medical College, Jodhpur. The clinical diagnosis of BV is made in the presence of three of the following four signs first described by Amsel in 1938:
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 odour (positive 'whiff test') after addition of the amine potassium hydroxide (10%) to the vaginal secretions.
Results: The number of patients studied in both preterm and term labour groups were 100 each. On comparison, it was observed that patients having previous history of sexually transmitted infections, vaginal discharge suggestive of bacterial vaginosis, basic vaginal pH, positive Whiff test and finding of clue cells are more in preterm group compared to term group.
Conclusion: Preterm labour (PTL) and delivery are among the most challenging obstetric complications encountered. Bacterial vaginosis is a major cause of preterm labor. It was observed that patients having previous history of sexually transmitted infections, vaginal discharge suggestive of bacterial vaginosis, basic vaginal pH, positive Whiff test and finding of clue cells are more in preterm group compared to term group.
Thus the number of patients who fulfilled Amsel's criteria for diagnosis of bacterial vaginosis was significantly more in preterm labour group as compared to term labour group.

I. Introduction

Among the multiple causes of perinatal mortality and morbidity, one of the common cause is preterm labour.(1) Preterm delivery is a major contributor to neonatal morbidity and mortality and also it is well known that the risk of neonatal death increases exponentially with decreasing weight and gestational age.(2)

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. The cause of preterm labour (PTL) remains unknown, prophylaxis is unhelpful, prediction lacks specificity, diagnosis is difficult and the merits and demerits of tocolytic therapy still being debated. Preterm delivery is a major contributor to neonatal morbidity and mortality and its prevention assumed special importance. It is well known that the risk of neonatal death increases exponentially with decreasing gestational age and weight. It is how ever agonizing and frustrating fact that the incidence of prematurity has not declined and remained nearly constant at 7-10% pregnancies & have shown prematurity to be responsible for 85% perinatal deaths(3).

The causes of PTL could be maternal, fetal, placental or idiopathic.

Apart from the four important obstetric causes that result in preterm delivery; preterm labor, preterm PROM (premature rupture of membranes), maternal medical or obstetric complications and fetal distress or death; there is now substantial evidence that infection ascending in to the uterine cavity from lower genital tract is, associated with idiopathic preterm labor (4). Such infection can result in deciduitis, chorioamnionitis, amniotic fluid infection, fetal sepsis and IUFD.

Bacterial vaginosis is a polymicrobial disorder characterized by decrease in the number of H2O2 producing lactobacillus and overgrowth of several facultative anaerobic bacteria like Gardnerella vaginalis,

Haemophillus vaginalis, Mycoplasma, or anaerobes like Bacteriods sp, Prevotella sp and Mobiluncus sp.(5) Recently, new molecular methods have identified Atopobium vaginae as a BV associated microbe. In vagina, under physiologic condition the H_2O_2 producing lactobacillus accounts for 95% of flora and it acts against proliferation of other microbes by maintaining acidic PH5. In normal condition the ratio of anaerobe to aerobe is 2:1 to 5:1.In presence of bacterial vaginosis, there is a shift of this ratio to 100:1 and 1000:1, with subsequent decrease in acid producing lactobacillus(2) . Bacterial vaginosis is one of the common genital infections in pregnancy. 50% patients are asymptomatic and when the symptoms do occur, they are usually mild, and the common mode of presentation is malodorous vaginal discharge(6) . Bacterial vaginosis is believed to be the risk factor for preterm delivery as well as being associated with preterm premature rupture of membrane (PPROM), chorioamnionitis, and postpartum endometritis(7,8,9).

So far no study has been conducted in Dr. SN Medical College & associated hospital, Jodhpur about association between BV and preterm labour. The aim and objectives of the study is 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.

II. Material and Method

A cross sectional analytical study carried out over a period of 6 months on the patients admitted and delivered at our MDM & Umaid hospital, Department of obstetrics and gynaecology, Dr. S.N. Medical College, Jodhpur.
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.

Using a sterile vaginal speculum, vaginal swab will be collected from lower one-third of the vaginal wall. The vaginal swab will subjected for wet mount for detection of clue cells and KOH test (Whiff test). The pH of vaginal discharge will be tested using litmus paper. The clinical diagnosis of BV is made in the presence of three of the following four signs first described by Amsel in 1938:
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 odour (positive 'whiff test') after addition of the amine potassium hydroxide (10%) to the vaginal secretions.

III. Results

The number of patients studied in both preterm and term labour groups were 100 each.

TABLE 1: Age Distribution of Cases

Age (yrs)	Case		Control	
	N	%	N	%
≤20	8	8.00	6	6.00
21-24	51	51.00	55	55.00
25-28	24	24.00	24	24.00
29-32	10	10.00	10	10.00
≥33	7	7.00	5	5.00
Total	100	100.00	100	100.00
Median	24		24	

Range	18-37	18-36
Mean±SD	24.75±4.13	24.58±3.83

Unpaired t test, P value 0.763

Mean Age in preterm group is 24.75±4.13 years and in term group is 24.58±3.83 years.

The mean maternal age was comparable in both the groups with p value of 0.763(not significant)

TABLE 2: Obstetric history of patients in both the groups

Obstetric code	Case		Control		P value
	N	%	N	%	
G1	41	41.00	35	35.00	0.382*
G2	28	28.00	38	38.00	0.132*
G3	23	23.00	17	17.00	0.288*
G4	4	4.00	7	7.00	0.352*
≥G5	4	4.00	3	3.00	1.000**
Total	100	100.00	100	100.00	-

Chi square*/Fisher exact test**

In preterm group, 41 women were primigravida and in term group 35 women were primigravida. 4 women in preterm group were ≥G5 and in term group 3 women were ≥G5. (Not significant)

TABLE 3: Previous h/o sexually transmitted infections in both groups.

Previous H/O STI	Case		Control	
	N	%	N	%
Present	18	18.00	6	6.00
Absent	82	82.00	94	94.00
Total	100	100.00	100	100.00

Chi square test, p value 0.009 (S)

The proportion of patients who had h/o STIs in the past was significantly more in preterm labour group (18) as compared to term labour group (6) with a p value of 0.009(Significant).

TABLE 4: Nature of discharge in both the groups

Discharge	Case		Control	
	N	%	N	%
Green frothy	5	5.00	0	0.00
Grey frothy	7	7.00	0	0.00
Grey white	26	26.00	8	8.00
White curdy	19	19.00	15	15.00
White mucoid	24	24.00	15	15.00
No discharge	19	19.00	62	62.00
Total	100	100.00	100	100.00

Chi square test, p value <0.0001 (HS)

The pre-term labour group had more number of patients with the different grades of discharge as compared to term labour group; the difference was statistically significant with p value of <0.0001 (Highly Significant).

TABLE 5: Discharge suggestive of Bacterial Vaginosis in both the groups

Group	Suggestive of BV		Not Suggestive of BV		Total	
	N	%	N	%	N	%
Case	26	26.00	74	74.00	100	100.00

Control	8	8.00	92	92.00	100	100.00
Total	34	34.00	166	166.00	200	100.00

Chi square test, P value 0.0007 (HS)

The proportion of patients with discharge suggestive of bacterial vaginosis was significantly more in preterm labour group as compared to term labour group with a p value of 0.0007 (Highly significant).

TABLE 6: Vaginal pH in both the groups

Ph	Case		Control	
	N	%	N	%
Acidic	55	55.00	85	85.00
Basic	45	45.00	15	15.00
Total	100	100.00	100	100.00

Chi square test, p value <0.0001 (HS)

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 <0.0001 (Highly Significant).

TABLE 7: Whiff test result in both the groups

Whiff test	Case		Control	
	N	%	N	%
Positive	46	46.00	20	20.00
Negative	54	54.00	80	80.00
Total	100	100.00	100	100.00

Chi square test, p value <0.0001 (HS)

The proportion of patients who had a positive whiff test was significantly more in preterm group as compared to term group with p value <0.0001 (Highly significant).

TABLE 8: Findings of clue cells in both groups

Clue cells	Case		Control	
	N	%	N	%
Positive	25	25.00	4	4.00
Negative	75	75.00	96	96.00
Total	100	100.00	100	100.00

Chi square test, p value <0.0001 (HS)

In preterm group clue cells found in 25 patients and in term group only 4 had clue cells so with this p value <0.0001 (Highly Significant).

TABLE 9: Diagnosis of Bacterial vaginosis according to Amsel's criteria in both the groups

Amsel's criteria	Case		Control	
	N	%	N	%
≥3 Criteria	29	29.00	8	8.00
<3 Criteria	71	71.00	92	92.00
Total	100	100.00	100	100.00

Chi square test, p value 0.0001 (HS)

The proportion of patients who were diagnosed to have bacterial vaginosis according to Amsel's criteria was significantly more in preterm labour group (29) than in term labour group(8), with a p value of 0.0001 which is highly significant.

IV. Discussion

This study was conducted to study the prevalence of bacterial vaginosis with preterm and term labour in the Department of Obstetrics and Gynaecology, Dr. SN Medical College, Jodhpur. The number of patients studied in both preterm and term labour groups were 100 each and the results were subjected to statistical analysis.

From the study we have confirmed significant association between bacterial vaginosis and preterm labour. In our study the prevalence of bacterial vaginosis was 29% in the study group of preterm labour and in 8% in the control group of term labour with a p value 0.0001 which is highly significant.

In our study, the mean maternal age in both the groups was comparable (24.7 and 24.58 in preterm labour group and term labour group respectively). A similar study done by Chawanpaiboon S et al. had a mean maternal age of 26.7 yrs and 26.6 yrs respectively.(10) In our study most of mothers in preterm group are primigravida (41%) followed by second gravid (28%) also in term group most of cases are second gravida(38%) followed by primigravida(35%) so comparision is not significant. In the study done by Chawanpaiboon et al(11) the preterm group had 60% primigravidas and 40% multigravidas while the term group had 51.8% primigravida's and 48.2% multigravidas.

In our study, in preterm labour group 18% of patients had previous history of sexually transmitted infections as compared to 6% in term labour group with p value 0.009 which is significant. In a study done by Priyanka Chatterjee et al in2016, in preterm group 12% of patients had previous history of sexually transmitted infection as compared to 2% in term group(12). According to the results of the largest prospective study in the USA, T. vaginalis was significantly associated with low birth weight and preterm delivery.(13) 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.(14)

In our study the preterm group had significantly more number of patients with different grades of discharge as compared to term group. The majority of preterm patient had grey white discharge. According to the study of Paulo. CG et al, lower genital tract infections are very common among apparently healthy looking pregnant women with an overall prevalence of 40-54 %. (15)

In our study Preterm group had more number of patients (45%) with basic vaginal pH as compared to term group (15%) with p value <0.0001 which is highly significant. According to study by Masand D et al, proportion of patient having basic vaginal ph in preterm group was 46% as compared to term group i.e. 12%.(16)

In our study, the number of patients having a positive Whiff test in preterm group was significantly more (46%) as compared to term labour group (20%) with p value <0.0001 which is highly significant. According to a study done by Kavya K and Aruna M, proportion of patients having a positive Whiff test in preterm group was 44% as compared to term labour group 18%. (17)

In our study, in preterm group clue cells found in 25 patients and in term group only 4 had clue cells so with this p value <0.0001 which is highly significant. A similar study done by Agarwal et al. also showed sensitivity and specificity of clue cells to be 100%.

In our study the proportion of patients who were diagnosed to have bacterial vaginosis according to Amsel's criteria was significantly more in preterm labour group (29%) than in term labour group (8%) with a p value of 0.0001 which is highly significant. This observation correlated with other studies where it was concluded that BV is one of the important risk factors for preterm labour .

In our study the proportion of patients with discharge suggestive of bacterial vaginosis was significantly more in preterm labour group (26%) as compared to term labour group(8%). In a study conducted by Kavya K and Aruna M, the number of patients having vaginal discharge suggestive of bacterial vaginosis in preterm labour group were significantly more than in term labour group (28% vs. 4% respectively).(18)

V. Conclusion

From this study, it was analysed that maternal age and obstetrics history did not seems to affect the result. It was observed that patients having previous history of sexually transmitted infections, vaginal discharge suggestive of bacterial vaginosis, basic vaginal pH, positive Whiff test and finding of clue cells are more in preterm group compared to term group. Thus the number of patients who fulfilled Amsel's criteria for diagnosis of bacterial vaginosis were significantly more in preterm labour group as compared to term labour group.

Referances

[1]. Toth M, Wilkin SS, Ledger W, Thaler H. The role of infection in the etiology of preterm birth. Obstertric Gynaecology, 1998; 71: 723-26
[2]. Chandraharan E, Arulkumaran S. Recent advances in management of preterm labour. J obs Gynaecol Ind. 2005; 55(2);118-24.
[3]. McCormick MC. The contribution of low birth weight to infant mortality and childhood morbidity. N Engl J Med. 1985;312:82-90
[4]. McDonals HM, O. Loughlin, Vigneswaran R, et al. Impact of metronidazole therapy in women with bacterial vaginosis flora a randomized placebo controlled trial. Br. J Pbstetric Gynaecology, 1997; 170: 724-28
[5]. Vause S, Johnston T (2000) Management of preterm labor. BMJ 83(2): F79-F85.
[6]. Anotayanonth S, Subhedar NV, Nelson JP. Beta mimetics for inhibiting Preterm Labour. Cochrane Database of Systematic Review. 2007;(1).
[7]. Goepfert AR, Goldenberg RL. Prediction of prematurity. Curr Opin Obstet Gynecol. 1996;8:417- 27.
[8]. Toth M, Wilkin SS, Ledger W, Thaler H. The role of infection in the etiology of preterm birth. Obstertric Gynaecology, 1998; 71: 723-26

[9]. Romero R, chaiworapongsa H, kuivanemi H, Tromp G, bacterial vaginosis, the inflammatory response & the risk of preterm birth; A role of genetic epidemiology in prevention of preterm birth; American journal of Obstetrics and Gynaecology:2004: 190:1509-19.

[10]. Saifon Chawanpaiboon MD, Kanjana Pimol BN. Bacterial Vaginosis in Threatened Preterm, Preterm and Term Labour. J Med Assoc Thai 2010;93(12):1351-5.

[11]. Steiner J, Deiss F, et. al. Comparison of single-dose vs oneweek course of metronidazole for symptomatic Bacterial Vaginosis. JAMA 1994; 254: 1046-1049.

[12]. Priyanka Chatterjee et al. An observational study of bacterial vaginosis in preterm and term labour at a tertiary care. Indian Journal of Obstetrics and Gynaecology Research 2016;3(1):38-42

[13]. Giraldo PC, Ara´ujo ED, Junior J, Amaral RLG, Passos MRL, and Gonsalves AK. The Prevalence of Urogenital & Sex Transm Dis. 1997;24:353-60.

[14]. Cram LF, Zapata M, Toy EC et al. Genitourinary infections and their association with preterm labor. Am Fam Physician 2002;65:241-8.

[15]. Giraldo PC, Ara´ujo ED, Junior J, Amaral RLG, Passos MRL, Gonsalves AK. The prevalence of urogenital infections in pregnant women experiencing preterm and full-term labor. Infect Dis Obstet Gynecol. 2012;2012.

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

[17]. Kavya K, Aruna M. Prevalence of Bacterial Vaginosis in Preterm and Term Labour-an Observational Study. Invest Gynecol Res Women's Health.3(2). IGRWH.000557.2019.

[18]. Kavya K, Aruna M. Prevalence of Bacterial Vaginosis in Preterm and Term Labour-an Observational Study. Invest Gynecol Res Women's Health.3(2). IGRWH.000557.2019.