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Research Article

Incidence of bacterial vaginosis in patients with idiopathic preterm labour

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ABSTRACT

Background: The objectives of this study were to find the incidence of bacterial vaginosis in patients with idiopathic preterm labour and to assess maternal and fetal outcome.
Methods: The study was carried out in the department of Obstetrics and Gynaecology, Patna Medical College, Patna from September 2011 to September 2013.Study was done in 100 pregnant women. 50 patients were cases and 50 were control. Cases were patients admitted with idiopathic preterm labour and controls were patients admitted with term pregnancy. A thorough general, systemic and obstetrical examination was done. Speculum examination was done to exclude leaking and to note the type of discharge which was collected for the pH estimation, amine testing and for making a smear for gram staining. Diagnosis of bacterial vaginosis was confirmed on the basis of Nugent criteria. Maternal and fetal outcome was assessed.
Results: The incidence of bacterial vaginosis in patients with idiopathic preterm labour was 30 percent. Bacterial vaginosis was significantly (P <0.05) associated with idiopathic preterm labour. Out of 15 patients who had bacterial vaginosis, 13 had preterm delivery (<37 weeks). In 35 patients without bacterial vaginosis 21 had preterm delivery. Bacterial vaginosis was significantly associated with low birth weight babies (P <0.05). Bacterial vaginosis was significantly associated with neonatal jaundice and neonatal sepsis.
Conclusions: Bacterial vaginosis is strongly associated with preterm labour and delivery as well as adversely affects neonatal outcome. Thus screening for bacterial vaginosis in all pregnant women complaining of vaginal discharge and also in all patients with preterm labour is justifiable.

Keywords: Vaginal discharge, Neonatal jaundice, Neonatal sepsis, Puerperal sepsis

INTRODUCTION

The term "bacterial vaginosis" was first described in 1984.[1] Bacterial vaginosisis characterized as a polymicrobial condition in which a characteristic set of bacterial species seem to synergistically overgrow and cause local genital symptoms as well as upper reproductive tract pathhology. In healthy vagina the predominant microorganisms detected are acidophilic facultative Lactobacilli like L. crispatus, L. Jensenii, L. fermentum and L. gasseri. Others account for only ten percent of the bacteria recovered from the healthy vagina. Bacterial vaginosis is characterized by high concentrations of garderenella vaginalis, mycoplasma hominis, mobiluncus and other bacteroides species. These microorganisms are present in concentrations, which are 100-1000 fold higher than is found in the healthy vagina. Lactobacillus species which are normally present in high number are decreased in number or absent in bacterial vaginosis. Lactobacilli release lactic acid which decreases pH below 4.5, creating hostile environment for growth of other bacteria. They also produce lactacin B, acidolin, and hydrogen peroxide toxic to other bacteria. Reduction in their number allows other bacteria to grow. In bacterial vaginosis there is minimal inflammatory change because

of the absence of lactic acid and production of succinate which blunts the chemotactic response to polymorphs and their killing property. That's why it is termed "vaginosis" and not "vaginitis".

It is most prevalent cause of vaginal discharge and fifty percent of women are asymptomatic. Clinical diagnosis is based on the presence of three of the four following clinical criteria (Amsel's criteria):[2]

1. Homogeneous, thin vaginal fluid that adheres to the vaginal walls.
2. Vaginal fluid pH >4.5;
3. Release of amine odour with alkalinization of vaginal fluid 'whiff test'
4. Presence of vaginal epithelial cells with borders obscured with adherent small bacteria called "clue" cells.

Ascending uterine infection from the lower genital tract due to bacterial vaginosis has been linked with many pregnancy complications namely preterm labour, spontaneous abortion, premature rupture of membranes chorioamnionitis, post-partum endometritis and post caesarean wound infection.

This study was undertaken to find the association of bacterial vaginosis with preterm labour where other obvious causes of preterm labour have been ruled out.

Although bacterial vaginosis can be easily treated, but in many cases it remains untreated and persists for years because of its subtle symptoms and lack of awareness among females. Treatment with metronidazole should be done in all pregnant women with bacterial vaginosis. Timely treatment may reduce the incidence of preterm labour and may prevent its associated complications.

Aims and objective

1. To find the incidence of bacterial vaginosis in idiopathic preterm labour.

2. To assess maternal and fetal outcomes in patients with idiopathic preterm labour.

METHODS

The study was carried out in the department of Obstetrics and Gynaecology, Patna Medical College, Patna from September 2011 to September 2013.

Study was done in 100 pregnant women. 50 patients were cases and 50 were control. Cases were patients admitted with idiopathic preterm labour as per the selection criteria mentioned below:

Inclusion criteria

1. Singleton pregnancy
2. Gestational age between 28-36 weeks
3. Intact membranes
4. Painful uterine contractions >2 in 10 minutes, each lasting >45 seconds
5. Cervical dilatation between 1 to 3 cm.
6. Cervical effacement >25%

Exclusion criteria

1. Gestational age <28 weeks
2. History of antepartum hemorrhage, urinary tract infections, respiratory tract infections, diarrhea or any other obvious cause for preterm labor.
3. Medical complications of pregnancy such as hypertension and diabetes mellitus.
4. History of leaking per vaginum or absent membranes
5. Multiple pregnancy
6. Intrauterine growth restriction
7. Intrauterine fetal death
8. Antibiotic therapy in the last 30 days.

Control group included 50 women carrying singleton pregnancy at term gestation and not having any other complications (exclusion criteria 2-8)

Following protocol was followed in all patients:

- Name
- Address
- Age
- Parity
- Complaints
- Menstrual history
- Pregnancy outcome

A thorough general and systemic examination was done to exclude exclusion criteria. A detailed obstetrical examination was done to note the fundal height, abdominal girth, presentation, uterine contractions (intensity, frequency and duration), and fetal heart pattern and rate. Speculum examination was done to exclude leaking and to note the type of discharge which was collected for the pH estimation, amine testing and for making a smear for gram staining. Vaginal examination was also done to note the dilatation and effacement of cervix and to confirm the presence of membranes.

Diagnosing criteria

1. Appearance of vaginal discharge:
- Per speculum examination was performed. Speculum was introduced into the vagina without lubricating with any antibacterial agent containing cream. The blade was opened and the appearance of vaginal discharge was seen. A homogenous, thin vaginal fluid that adheres to the vaginal walls is suggestive of bacteria vaginosis.
2. Vaginal fluid pH:
- Normal vaginal pH is 3.8-4.2.

- The pH was measured by using cardinal pH indicator strips with a range of 3.6 to 6.1 with distinct colour keep for 3.6, 4.1, 4.4, 4.7, 5.0, 5.3, 5.6, 6.1.
- Sample was obtained from the lateral vaginal wall or posterior fornices avoiding contamination with the cervical mucous using dipstick with help of speculum and matched with the scale provided.

3. Clue cells by wet mount preparation:

- Presence of vaginal epithelial cells with borders obscured with adherent small bacteria are called clue cells.
- Microscopic examination of a saline wet mount preparation of vaginal discharge was done. A drop of discharge was mixed with a drop of normal saline on a glass slide, covered with a clean cover slip and examined under a high power for the presence of clue cells.

4. Whiff test:

- Release of fishy or amine odour with alkalinisation of vaginal fluid.
- 2 to 3 drops of 10% potassium hydroxide was added to the vaginal discharge on the speculum and sniffing the mixture. The test was interpreted as positive if a fishy odour was noted.

5. Grain stain diagnosis:

- Bacterial vaginosis is characterized by a shift from predominance of lactobacillus morphotvpes to predominance of cocobacillarymorphotypes and gram negative rods.

Gram stain diagnosis was based on Nugent's scoring[3] (Table 1 & 2).

Table 1: Nugent's scoring system.[3]

Lactobacilli	Score	Gardenerella, Bcteroides	Score	Curved Gram negative bacilli	Score	Sum (N)
30 or more	0	0	0	0	0	0
5-30	1	<1	1	<1	1	3
1-4	2	1-4	2	1-4	1	5
<1	3	5-30	3	5-30	2	8
0	4	30 or more	4	30 or more	2	10

Table 2: Interpretation of Nugent score.[3]

If N score is	AND	Result
0-3		Smears not consistent with BV
4-6	Clue cells not present	
4-6	Clue cells are present	Smears consistent with BV
≥7		

Pregnancy outcome

Maternal outcome was assessed as follows:

- Preterm delivery
- Mode of delivery
- Puerperal sepsis

Fetal outcome was assessed as follows:

- Birth weight
- Apgar score
- Congenital anomaly
- Neonatal jaundice
- Neonatal sepsis
- Neonatal death

RESULTS

Cases and controls were distributed equally in age group and according to gravidity (Table 3/Figure 1, Table 4/Figure 2).

Table 3: Distribution of total patients according to age.

Age (years)	Number of patients (%)
<20	10 (10%)
20-30	60 (60%)
>30	30 (30%)
Total	100 (100%)

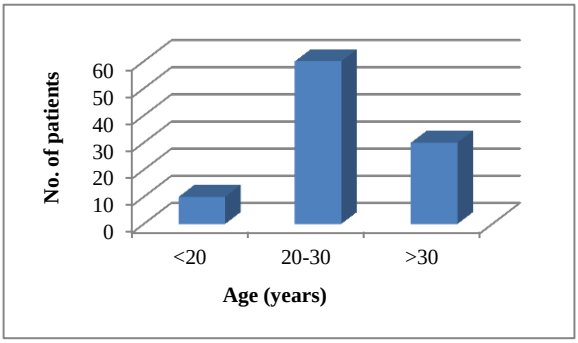

Figure 1: Distribution of patients according to age.

Table 4: Distribution of total patients according to gravidity.

Gravidity	Number of patients (%)
G1	26 (26%)
G2	26 (26%)
G3	28 (28%)
≥G4	20 (20%)
Total	100 (100%)

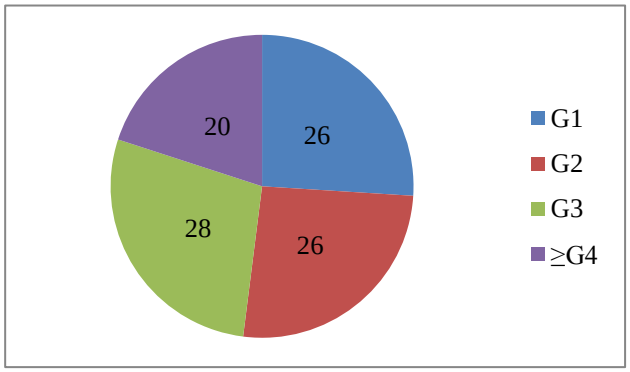

Figure 2: Distribution of patients according to gravidity.

Fifteen out of fifty (30%) patients with idiopathic preterm labour were tested positive for bacterial vaginosis. Only two patients in control group (4%) were tested positive for bacterial vaginosis. Thus the incidence of bacterial vaginosis in patients with idiopathic preterm labour was 30 percent. Bacterial vaginosis was significantly (P <0.05) associated with idiopathic preterm labour (Table 9/Figure 3).

Table 5: Distribution of patients according to presence of vaginal discharge.

Discharge	No. of cases	No. of controls
Present	25 (50%)	4 (8%)
Absent	25 (50%)	46 (92%)

Table 6: Distribution of patients according to vaginal pH.

pH	Number of cases (%)	Number of controls (%)
≤4.5	23 (46%)	45 (90%)
≥4.6	27 (54%)	5 (10%)

Table 7: Result of Whiff test.

Whiff test	Number of cases (%)	Number of controls (%)
Positive	15 (30%)	3 (6%)
Negative	35 (70%)	47 (94%)

Table 8: Distribution of patients according to presence of clue cells.

Clue cells	Number of cases (%)	Number of controls (%)
Present	13 (26%)	2 (4%)
Absent	37 (64%)	48 (96%)

Table 9: Distribution of patients according to presence of bacterial vaginosis.

Bacterial vaginosis	Number of cases (%)	Number of controls (%)
Present	15 (30%)	2 (4%)
Absent	35 (70%)	48 (96%)

X^2=11.86, P = 0.00057, Relative risk = 7.5, Odds ratio = 10.28

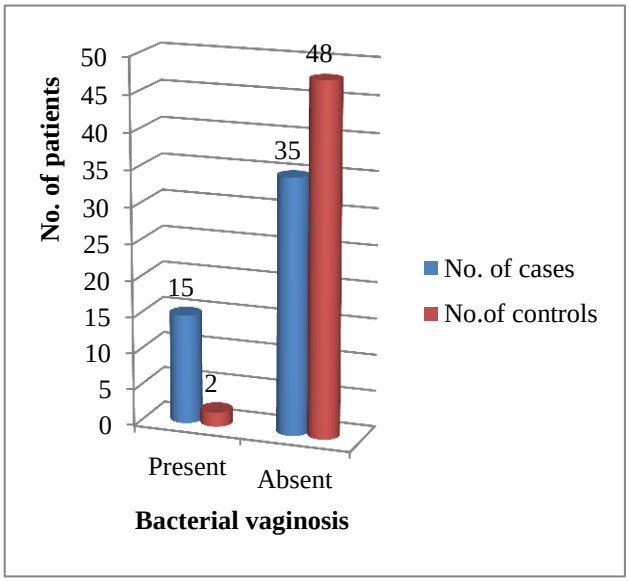

Figure 3: Distribution of patients according to presence of bacterial vaginosis.

Out of 15 patients who had bacterial vaginosis, 13 had preterm delivery (<37 weeks). In 35 patients without bacterial vaginosis 21 had preterm delivery. Preterm delivery is significantly associated with bacterial vaginosis (P <0.05) (Table 10).

Table 10: distribution of cases according to gestational age at delivery.

Gestational age	BV positive patients	BV negative patients
<34 weeks	8 (16%)	2 (4%)
34-37weeks	5 (10%)	19(38%)
>37 weeks	2(4%)	14(28%)
Total	15(30%)	35(70%)

Out of 15 bacterial vaginosis positive patients 11 (73.33%) had low birth weight infants (wt. <2.5 kg) and 2

had very low birth weight babies (wt. < 2 kg). In patients without bacterial vaginosis 13 (37.14%) had low birth weight infants and 1 baby was very low birth weight. BV is significantly associated with low birth weight babies (P <0.05) (Table 12/Figure 4).

Table 11: Preterm and term deliveries in bacterial vaginosis positive and negative patients.

Bacterial vaginosis	Preterm delivery (<37 weeks)	Term delivery (>37 weeks)	Total
Present	13	2	15
Absent	21	14	35
Total	34	16	50

X^2 =3.36; P = 0.04

Table 12: Birth weight at delivery in patients with preterm labour.

Birth weight	BV positive patients	BV negative patients
<2 kg	2	1
2-2.5 kg	9	12
2.5-3 kg	4	22
≥3 kg	0	0

X^2=6.22; P = 0.045

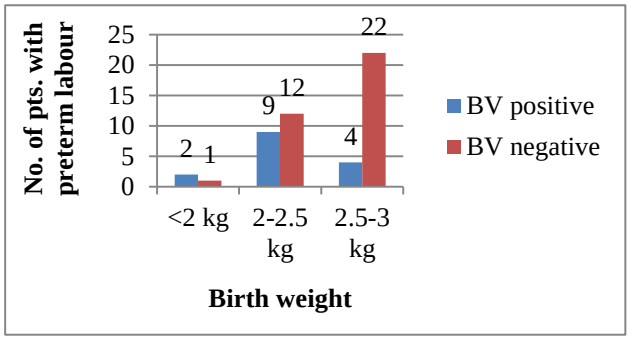

Figure 4: Birth weight at delivery in patients with preterm labour.

Congenital anomaly was present in 1 baby of bacterial vaginosis positive mother and 2 babies of bacterial vaginosis negative mother. Association between presence of bacterial vaginosis and congenital anomaly is not significant (Table 13).

Table 13: Mode of delivery in patients with preterm labour.

Mode of delivery	BV positive patients	BV negative patients
V/D	14 (28%)	34 (68%)
LSCS	1 (2%)	1 (2%)
Total	15 (30%)	35 (70%)

Neonatal jaundice was significantly present in bacterial vaginosis positive patients (P <0.05) (Table 15/Figure 5) and neonatal sepsis occurred more among babies of bacterial positive mothers (P <0.05) (Table 16/Figure 6).

Table 14: Puerperal sepsis in preterm labour patients.

Puerperal sepsis	BV positive patients	BV negative patients
Present	1	2
Absent	14	33

P = 0.897

Table 15: Congenital anomaly in preterm labour patients.

Congenital anomaly	BV positive patients	BV negative patients
Present	1	2
Absent	14	33

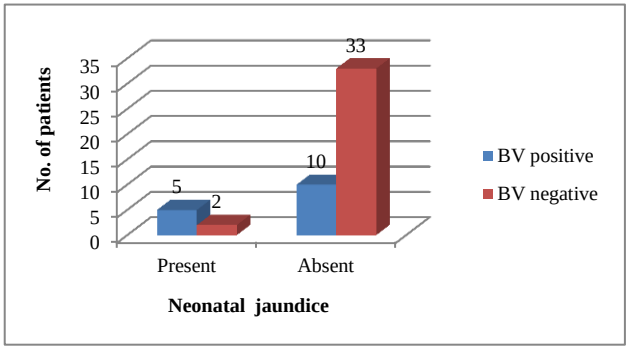

Figure 5: Neonatal jaundice in preterm labour patients.

Table 16: Neonatal jaundice.

Neonatal jaundice	BV positive patients	BV negative patients
Present	5	2
Absent	10	33

X^2=6.65; P = 0.01

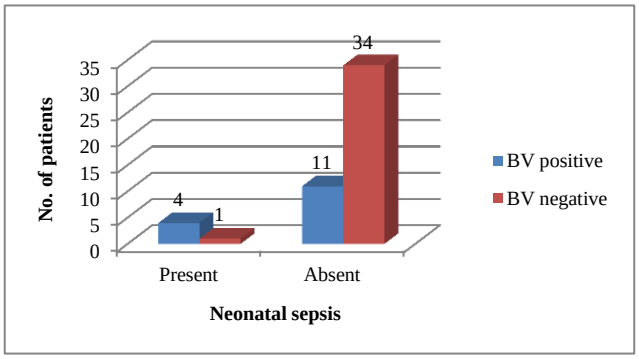

Figure 6: Neonatal sepsis in preterm labour patients.

Table 17: Neonatal jaundice.

Neonatal sepsis	BV positive patients	BV negative patients
Present	4	1
Absent	11	33

X^2=6.61; P = 0.01

Table 18: Neonatal death.

	BV positive	BV negative
Neonatal death	2	1

DISCUSSION

Preterm delivery is the major cause of perinatal morbidity and mortality. The etiology is multifactorial, but there is now substantial evidence that infection ascending in the uterine cavity from lower genital tract is associated with preterm labour. Bacterial vaginosis presumably result in preterm labour by same process and in many cases remains undiagnosed because it is frequently asymptomatic and screening for bacterial vaginosis is not routinely performed.

In this study preterm labour was found to be statistically significant among bacterial vaginosis positive patients (odds ratio = 10.28, P <0.01). Kurki et al.[4] and Gravett et al.[5] also demonstrated the same finding in their study.

In their study Shilpa MN et al.[6] showed the prevalence of bacterial vaginosis among preterm labour group was 22% and its prevalence among full term group was 4% (P = 0.007). Results are similar to this study in which bacterial vaginosis is present among 30% of patients with preterm labourand 4% of patients with term pregnancy (P <0.01).

This study showed that bacterial vaginosis is significantly associated with low birth weight infants with weight <2.5 kg (P <0.05). Shilpa MN et al.[6] in their study showed that 90% of patients with bacterial vaginosis delivered a low birth weight infant. Study by Hillier et al.[7] showed similar result. Gravett et al.[5] demonstrated low birth weight infants among bacterial vaginosis positive patients (P <0.005).

Study done by Mariam Anjum et al.[8] did not show association of bacterial vaginosis with neonatal jaundice. In this study neonatal jaundice was present in five infants of bacterial vaginosis positive mother while only two infants of bacterial vaginosis negative mother had neonatal jaundice (P <0.05). The result may be due to association of bacterial vaginosis with preterm infants. Neonatal sepsis occurred more frequently among infants of bacterial vaginosis positive patients (P = 0.01) and is in agreement with the result shown by Mariam Anjum's[8] study.

CONCLUSION

From this study, we can conclude that bacterial vaginosis is strongly associated with preterm labour and delivery as well as adversely affects neonatal outcome. Thus screening for bacterial vaginosis in all pregnant women complaining of vaginal discharge and also in all patients with preterm labour is justifiable.

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