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Clinical Presentation of Bacterial Vaginosis During Labour

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Abstract- *Background:* Presence of bacterial vaginosis in pregnancy and labour has potential risks. There is an increased risk for preterm delivery, in addition to progression of vaginosis to vaginitis and cervicitis. The steady progression of inflammation often affects the fetus, resulting in chorioamnionitis and premature rupture of membranes. This study was carried out to evaluate the prevalence and impact of bacterial vaginosis among pregnant women.

Methods: This cross sectional study was carried out among 106 pregnant women who were admitted in labour in our facility. Vaginal pH was determined by swabbing the lateral and posterior fornices of the vagina, and the swab was directly placed on the litmus paper to determine the pH. Whiff's test was performed. Gram stain was carried out and diagnosis of Bacterial Vaginosis was made based on Nugent's criteria.

Results: The prevalence of Bacterial vaginosis based on Nugent's criteria was 16.04%. There was a statistically significant association between Bacterial Vaginosis and preterm labour ($p<0.05$) and also between Bacterial Vaginosis and low birth weight, with a mean birth weight of 2100 grams among participants with BV compared to 3210 grams among normal pregnant mothers ($p<0.05$).

Conclusion: Diagnosis of bacterial vaginosis is possible by early detection and thereby prevention of preterm labour by treatment is possible which would play a great role in significant reductions in the preterm birth and its adverse sequelae.

Keywords: *bacterial vaginosis, lactobacillus, whiff's test, clue cells, preterm labour, low birth weight.*

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Clinical Presentation of Bacterial Vaginosis During Labour

Lakshmi Subburaj [α], Seetha Panicker [σ] & Raj Kumar [ρ]

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I. Introduction

The adult vagina normally contains bacteria as a part of normal vaginal flora. The most common bacteria include Lactobacillus species, alpha hemolytic streptococci and Clostridia species. These bacteria help in maintaining the normal pH of the vagina and also prevent the growth of other potential pathogens. [1] An imbalance in the normal vaginal bacteria can result in increased production of anaerobic bacteria, and this condition is termed as bacterial vaginosis.[2] Bacterial vaginosis (BV) is the most common cause of vaginal symptoms in pregnant women, affecting upto 35% of the pregnant women in developing countries like India.[3] Poor socioeconomic conditions, illiteracy and poor personal hygiene are some of the factors which are responsible for high prevalence rates in India.

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Bacterial Vaginosis results in polymicrobial alteration of the vaginal flora thereby increasing the vaginal pH to >4.5. In some cases, BV is associated with homogenous discharge, however, absence of demonstratable inflammatory response makes the clinical management more challenging. The commonly used diagnostic tools include estimation of vaginal pH, gram staining, Whiff's test and detection of clue cells. However, with increasing prevalence of strains resistant to metronidazole, newer techniques like Polymerase Chain Reaction (PCR) based detection of rRNA genes are being employed for both diagnosis and prognosis.[4]

Presence of bacterial vaginosis in pregnancy and labour has potential risks. There is an increased risk for preterm delivery, in addition to progression of vaginosis to vaginitis and cervicitis. The steady progression of inflammation often affects the fetus, resulting in chorioamnionitis and premature rupture of membranes. In severe, undetected cases, BV can result in intrauterine death. Although several studies in India have reported the prevalence of BV, very few studies have documented its impact, especially in the rural setting of South India. A hospital based evaluation of the magnitude and burden of BV is essential for planning preventive and curative strategies at the population level.

II. Objectives

This study was carried out to

- Estimate the prevalence of BV in asymptomatic pregnant women
- Evaluate the complications of BV on pregnancy and labour

III. Methodology

a) Study setting and participants

This study was carried out as cross sectional study for a period of 11 months between January to November 2013 among the pregnant women admitted to our facility at the time of labour.

b) Selection and sampling

All the pregnant women admitted with onset of labour during the study period were taken up for the study. Women with premature rupture of membranes were excluded. Based on intensive literature review, the prevalence of BV in a study done in South India was

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found to be 36.4%.[3] At 95% confidence limits and 10% absolute precision, the sample size was estimated to be 88.8. Accounting 10% for non response, the sample size was calculated as 97.6 and rounded off to 100. A total of 106 pregnant women participated in the study. The participants were selected using purposive sampling.

c) Ethical approval and informed consent

Approval was obtained from the Institutional Ethics Committee prior to the commencement of the study. Each participant was explained in detail about the study and informed consent was obtained prior to the data collection.

d) Data collection

On admission, sterile vaginal speculum examination was carried out. The character and consistency of the vaginal discharge was visually inspected. Vaginal pH was determined by swabbing the lateral and posterior fornices of the vagina, and the swab was directly placed on the litmus paper to determine the pH. Whiff's test was performed by adding 10% KOH to the specimen to detect the presence of 'fishy' odour, which is suggestive of BV. Gram stained smears were examined under oil immersion for morphotypes and presence of clue cells. A 10 point scoring system was applied for detection of the morphotypes. (table 1) Confirmation of BV was made based on Nugent's criteria.[5]

e) Data analysis

Data was entered and analysed using SPSS ver.20 software. The prevalence of BV was expressed in percentages. The association between BV and pregnancy outcomes were analysed by chi square test. A p value <0.05 was considered statistically significant.

IV. Results

The present study was carried out among 106 pregnant women who were admitted to our facility during the study period. Majority of the participants were registered (89.6%) and were primigravida (73.6%). (table 2) The prevalence of BV based on various diagnostic criteria is given in table 2. While pH estimation was positive in 35.8% of the participants, the confirmatory Nugent's criteria was positive in 16.04%. (table 3).

The pregnancy outcomes among the study participants is presented in figure 1. Low birth weight was present in 17.9% of the participants of which 73.7% had BV. Similarly, preterm labour was observed in 13.2% of the participants of which 42.8% had BV.

The present study observed a statistically significant association between BV and preterm labour ($p<0.05$). (table 4) Similarly, there was a statistically significant association between BV and low birth weight, with a mean birth weight of 2100 grams among participants with BV compared to 3210 grams among normal pregnant mothers ($p<0.05$). (Table 5).

V. Discussion

Prematurity remains one of the major causes of perinatal mortality and morbidity in India. The etiology and risk factors of preterm labour are multifactorial. Recently, lower genital tract infections have been attributed to preterm labour and one of the most predominant caused of lower genital tract infections is bacterial vaginosis. In the current study, the prevalence of BV, as estimated using Nugent's criteria was 16.04%, similar to other published literature, as observed by Purwar M et al (11.5%).[6] However, a study done by Mathew R et al reported a higher prevalence of 38.5%.[3] This difference could have occurred due to the differences in the population covered between the two studies. The justification for using Nugent's criteria for diagnosis is supported by the fact that this technique helps not only in storage of the slides for a longer period for reference, but also is suitable for quick screening and identification of intermediate flora.

The present study has proven a statistically significant association between BV and preterm labour and also with low birth weight ($p<0.05$). Several studies are supportive of this evidence. A study done by Hillier et al has observed a relative risk of 2.0 among women with BV in undergoing preterm delivery ($p<0.05$).[7] Similar findings were observed in studies done by Leitich H et al and Klebanoff MA et al.[8,9] In another study done by Hillier et al, there was a statistically significant relationship observed between BV and low birth weight, in addition to being a potent risk factor for preterm delivery. Presence of BV contributes to spontaneous preterm delivery by triggering localized inflammation of the endometrium, creating an environment incompatible for proper placenta formation. This in turn triggers increased production of circulating cytokines which results in preterm premature rupture of membranes (PPROM) and thereby cause preterm delivery. Presence of proinflammatory cytokines cause release of prostaglandins which trigger uterine contractions. Moreover, the lower genital tract bacteria invades the chorioamniotic space and infiltrates the placenta and amniotic fluid. Studies have established strong, two-fold increase in the risk of preterm labour in the presence of Gardnerella vaginalis.[4] Presence of chorioamnionitis further triggers neonatal sepsis, resulting in low birth weight and adverse neonatal outcomes including meconium aspiration, respiratory distress and increased risk of NICU admissions.[10]

Although metronidazole has been effective in the management of BV in non pregnant women, studies have recently demonstrated a resistance to metronidazole in the later gestational age. This phenomenon is attributed to the route of administration and also to the type of bacterial colonization present. It has been observed that vaginal administration of metronidazole has better outcomes in terms of

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preventing preterm labour. Since lactobacilli are resistant to metronidazole, isolation of lactobacilli in the vaginal smears pose a significant challenge in the clinical management.

VI. Conclusion

Abnormal vaginal bacterial flora is an important cause of adverse obstetric outcomes. Bacterial vaginosis is associated with high rates of spontaneous preterm labour, PPROM, low birth weight, chorioamnionitis, and postpartum endometritis. It is also associated with gynecological morbidities like pelvic inflammatory disease, cervical intra epithelial neoplasia and post hysterectomy vaginal cuff infection. A simple method like gram-stained examination of vaginal smear is found to be useful in diagnosing bacterial vaginosis. If the diagnosis of bacterial vaginosis is possible by early detection, prevention of preterm labour by treatment is possible and would play a great role in significant reductions in the preterm birth and its adverse sequelae.

Declaration

Conflict of interest – nil

Funding –nil

Ethical approval –obtained

References Références Referencias

1. Larsen B, Monif GRG. Understanding the bacterial flora of the female genital tract. Clin Infect Dis 2001;32(4):e69-e77.
2. Shimaoka M, Yo Y, Doh K, Kotani Y, Suzuki A, Tsuji I, et al. Association between preterm delivery and bacterial vaginosis with or without treatment. Sci Rep 2019;9:509.
3. Mathew R, Sudhakshina R, Kalyani M, Jayakumar S, Lal B, Banu S. Microbiological profile of vaginosis among women of the reproductive age group, who attended a tertiary care hospital. J Clin Diagn Res 2011; 5(8):1548-1551.
4. Nelson DB, Hanlon A, Hassan S, Britto J, Geifman-Holtzman O, Haggerty C et al. Preterm labour and bacterial vaginosis-associated bacteria among urban women. J Perinat Med 2009;37(2):130-134
5. Mohammedzadeh F, Dolatian M, Jorjani M, Majd HA. Diagnostic value of Amsel's Clinical Criteria for diagnosis of Bacterial Vaginosis. Glob J Health Sci 2015;7(3):8-14.
6. Purwar M ,Ughade S, Bhagat B, Agarwal V, Kulkarni H. Bacterial vaginosis in early pregnancy and adverse pregnancy outcome. J Obstet Gynaecol Res 2001; 27(4): 175-81.
7. Hillier SL, Nugent RP, Eschenbach DA, Krohn MA, Gibbs RS, et al. Association between bacterial vaginosis and preterm delivery of a low birth weight infant. The vaginal infections and prematurity study group. N Engl J Med 1995;333(26):1737-42.
8. Leitich H, Bodner-Adler B, Brunbauer M, Kaider A, Egarter C, Husslein P. Bacterial vaginosis as a risk factor for preterm delivery: a metaanalysis. Am J Obstet Gynecol 2003;189:139–47.
9. Klebanoff MA, Hillier SL, Nugent RP, MacPherson CA, Hauth JC, Carey JC, et al. Is bacterial vaginosis a stronger risk factor for preterm birth when it is diagnosed earlier in gestation? Am J Obstet Gynecol 2005;192:470–7.
10. Dingens AS, Fairfortune TS, Reed S, Mitchell C. Bacterial vaginosis and adverse outcomes among full term infants: a cohort study. BMC Pregnancy and childbirth 2016; 16, 278 (2016) doi: 10.1186/s12884-016-1073-y

Tables & Figures

Table 1: Bacterial morphotype scoring based on gram staining

S. No.	Morphotype	Scoring				
		0	1+	2+	3+	4+
1	Long gram positive rod	4	3	2	1	0
2	Small gram negative variable rod	0	1	2	3	4
3	Curved gram negative variable rod	0	1	1	2	2

Table 2: Background characteristics of the study participants

S. No.	Characteristics	Frequency (n=106)	Percentage (%)
1	Registration of pregnancy		
	Booked	95	89.6
	Un-booked	11	10.4
2	Gravida		
	Primigravida	78	73.6
	Multigravida	28	26.4

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Table 3: Prevalence of bacterial vaginosis by various diagnostic methods

S. No.	Diagnostic methods	Frequency (n=106)	Percentage (%)
1	Homogenous vaginal discharge	14	13.2
2	Vaginal fluid pH >4.5	38	35.8
3	Whiff's test	25	23.6
4	Gram stain examination of clue cells	13	12.3
5	Nugent's criteria	17	16.04

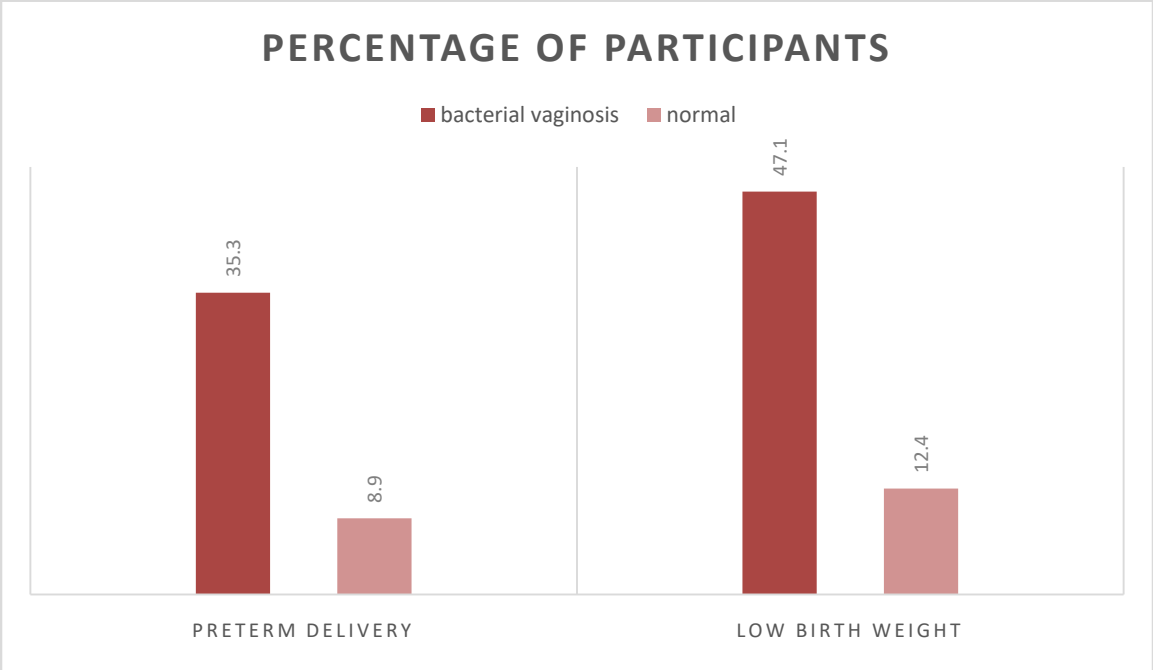


Figure 1: Pregnancy outcomes among the study participants

Table 4: Association between bacterial vaginosis and pregnancy outcomes - preterm delivery

S. No.	Disease condition	N	Preterm delivery n(%)	Term delivery n(%)	Chi sq	p value
1	Bacterial vaginosis	17	6(35.3)	11(64.7)	8.6	0.003*
2	Normal	89	8(8.9)	81(91.1)		
Total		106	14	92		

**statistically significant*

Table 5: Association between bacterial vaginosis and pregnancy outcomes- low birth weight

S. No.	Disease condition	N	Low birth weight n(%)	Normal birth weight n(%)	Chi sq	p value
1	Bacterial vaginosis	17	8(47.1)	9(52.9)	11.7	0.0006*
2	Normal	89	11(12.4)	78(87.6)		
Total		106	19	87		

**statistically significant*

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