Bacterial vaginosis – a risk factor for preterm labour: a case-control study

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Abstract

Aim: To estimate the prevalence of bacterial vaginosis in preterm labour patients when compared to term labour patients.

Materials and Method: It was a hospital based prospective case-control study conducted over a period of two years. Study population was selected as per our study criteria. Speculum examination was done for both control and cases and evaluated for any abnormal vaginal discharge and vaginal pH. Smear from posterior fornix was taken using sterile cotton swabs for wet mount and KOH test (Whiff test). Diagnosis of bacterial vaginosis was made if three of the four signs of Amsel criteria were found. The data were analysed using SPSS software 20 and results were derived.

Results: Among the patients bacterial vaginosis was present in 24 of the preterm labour (26.7%) patients and 5 of the term labour (5.6%) patients (Table 1). It was statistically significant ($p < 0.001$) by Chi-square test. Considering the relative risk(RR), women with bacterial vaginosis has increased risk of preterm labour when compared to patients without bacterial vaginosis(Odds ratio - 6.182;RR-4.800).

Conclusion: Our study concluded that bacterial vaginosis is one of the most important causes of preterm labour. Routine screening and treatment of bacterial vaginosis for women at high risk for preterm labour will help in reduction of preterm birth related perinatal morbidity and mortality.

Keywords: Bacterial vaginosis, Amsel criteria, Preterm labour, Preterm birth, Perinatal morbidity

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Introduction

Preterm birth, defined as delivery before 37 completed weeks of gestation, is the single most important factor of adverse neonatal outcome.(1) It is the leading cause of perinatal and neonatal morbidity and mortality worldwide.(2) With the increasing contribution of neonatal deaths to overall childhood mortality, it is crucial to address the predisposing factors related to preterm birth to achieve reduction in perinatal and child mortality.(3-5) Many evidence based studies suggest that vaginal infections play a key role in preterm births, which is especially true in bacterial vaginosis. Bacterial vaginosis is a common but poorly understood clinical syndrome where the vaginal flora's symbiotic relationship shifts for unknown reasons to one in which anaerobic species overgrow like Gardnerella vaginalis, Mobilincus and Ureaplasma urealyticum, etc. It is diagnosed by demonstrating three of the following four Amsel's criteria:(6)

- Demonstration of clue cells on a saline smear is the most specific criterion for diagnosing BV. Clue cells are vaginal epithelial cells that have bacteria adherent to their surfaces. The edges of the squamous epithelial cells, which normally have a sharply defined cell border, become studded with bacteria. The epithelial cells appear to be peppered with coccobacilli.
- A pH greater than 4.5 indicates infection, and pH may be elevated in up to 90% of patients with BV.
- Characteristic discharge appearance is thin, gray, and homogeneous.
- The whiff test may be positive in up to 70% of BV patients. This test is performed by placing a drop of 10% KOH on the speculum after the vaginal examination or mixing vaginal fluid with a drop of KOH on a microscope slide. The KOH, by virtue of its alkaline properties, causes the release of volatile amines from the vaginal fluid. The amines are products of anaerobic bacterial metabolism.

Women with bacterial vaginosis found to have higher incidence of preterm delivery.(7) Many trials have found a significant reduction in preterm births among pregnant women with high risk of preterm birth and whose bacterial vaginosis was treated with metronidazole.(8,9) Hence, this study was designed to estimate the prevalence of bacterial vaginosis in preterm labour patients when compared to term labour patients.

Materials and Method

It was a hospital based prospective case-control study conducted in Dept of OBG in our teaching medical college and hospital over a period of two years (Jan2014 -Dec2015).

Case selection: Patients at ≥28weeks till $\leq 36^{+6}$ weeks admitted in labour ward with true labour pains were informed about the study and well informed consent was obtained. From these patients, patients with known causes of preterm labour were excluded.

Exclusion Criteria:
Women ≤ 18years or ≥35 years
Previous H/O preterm labour
Premature rupture of membranes
Multiple pregnancy
Placenta previa/Abruptio placentae
Uterine anomalies/ Fibroid uterus altering the shape of the endometrial cavity
Pregnancy Induced Hypertension/ Diabetes mellitus
H/O Urinary tract infections/ vaginal candidiasis/ Trichomoniasis in current pregnancy

Control selection: Equal number of patients at ≥37 weeks admitted in labour ward in the same period with true labour pains but intact membranes were informed about the study and recruited as control population after well informed consent. Exclusion criteria was not applied to control patients.

Speculum examination was done for both control and cases and evaluated for any abnormal vaginal discharge, vaginal pH. Smear from posterior fornix was taken using cotton sterile swabs for wet mount, KOH test (Whiff test). Diagnosis of bacterial vaginosis was made if three of the four signs of Amsel criteria were found. The data were analysed using SPSS software 20 and results were derived.

Results

In this study, as per our study criteria, 90 pre term labour patients were recruited as cases and same number of term labour patients was recruited as controls during our study period. All the cases and controls were studied for the presence of bacterial vaginosis. Among them bacterial vaginosis was present in 24 of the preterm labour (26.7%) patients and 5 of the term labour (5.6%) patients (Table 1). It was statistically significant ($p < 0.001$) by Chi-square test(Table 2a). Considering the relative risk(RR), women with bacterial vaginosis has increased risk of preterm labour when compared to patients without bacterial vaginosis(Odds ratio -6.182; RR-4.800)(Table 2b)

Table 1: Prevalence of Bacterial vaginosis

Bacterial vaginosis	Present	Absent
Control (Term labour)	5(5.6%)	85(94.4%)
Cases (Preterm labour)	24(26.7%)	66(73.3%)

Table 2a: Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	14.839[a]	1	.000		
Continuity Correction[b]	13.318	1	.000		
Likelihood Ratio	15.937	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	14.757	1	.000		
N of Valid Cases	180				

Table 2b: Risk Estimate

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for Type (Preterm labor (case) / Term labor (control))	6.182(Odds ratio)	2.239	17.071
For cohort Disease = Present	4.800(Relative risk)	1.916	12.022
For cohort Disease = Absent	.776	.679	.888
N of Valid Cases	180		

Discussion

Bacterial vaginosis is associated with significant number of obstetric complications, such as, preterm labour and delivery, preterm premature rupture of the membranes, spontaneous miscarriages, chorioamnionitis, postpartum endometritis, post caesarean delivery and infections.[10-12] Bacterial vaginosis is a polymicrobial infection resulting in a reduced concentration of lactobacilli and an increase in pathogenic bacteria, mainly anaerobes or microaerophiles.[13,14] In pregnant women, bacterial vaginosis prevalence was ranging from 6% to 32%.[15] In our current study it was 26.7% in preterm labour and 5.6% in term labour patients. The prevalence of bacterial vaginosis in preterm labour patients in our present study is similar to study by Mittal et al[16] and Svare et al.[17]

In present study bacterial vaginosis is found to be more common in preterm labour patients (26.7%) when compared to term labour patients (5.6%) which is statistically significant ($p<0.001$). Our observation reinforces that bacterial vaginosis is one of the important risk factors for preterm labour as supported by other studies by Hillier et al[18] and Subtil et al.[19] Inspite of many studies proving the association between bacterial vaginosis and preterm labour, screening and

treatment in large scale studies of women at low risk of adverse outcomes were not able to demonstrate a reduction in prematurity.[20] So routine screening in average risk asymptomatic women is not recommended.[21] The Health Canada Guidelines on Sexually Transmitted Infections recommends that there is no need for screening or treatment of asymptomatic or low risk women, at the same time, it also recommends to screen and treat at 12-16weeks gestation for high risk women.[22,23]

To conclude, bacterial vaginosis is one of the most important causes of preterm labour. Routine screening and treatment of bacterial vaginosis for women at high risk for preterm labour will help in reduction of preterm birth related perinatal morbidity and mortality.

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