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Original Research Article

Study of association of bacterial vaginosis in preterm labor and fetal outcome

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Abstract

Background: Preterm labor has increasing evidence of infectious cause especially ascending infections from lower genital tract, of late attention is being given to bacterial vaginosis. In many of the case control and prospective studies bacterial vaginosis has been associated with late miscarriage, preterm labor, premature rupture of membranes, chorioamnionitis. Treating bacterial vaginosis can reduce the preventable cause of preterm birth.

Aim: The association of bacterial vaginosis in preterm and its fetal outcome.

Material and methods: A case control study of 120 pregnant women (Study group-60 and controls 60 cases). Pregnant women with preterm labor, 28 weeks to 37 weeks were selected. Vaginal discharge pH was measured. Sterile cotton swabs were used for vaginal smear preparation for gram staining and the organisms were scored based on Nugents scoring system. Clue cells were also noted on the smear. Diagnosis of bacterial vaginosis is done in women with pH above 4.5 and a score of 7 or more on gram staining of vaginal smear based on Nugents criteria. Outcome of delivery was observed.

Results: 61.6% were < 34 weeks of gestation. High vaginal pH >4.5 is seen in 55%. Chi Square test and the P value 0.001 (99.9%) showed significance of the test. Gram staining revealed bacterial vaginosis infection 41.6% in study group and 16.6% in control group. This study was in concurrence with the study made by Saifon Chawanpaiboon which showed an association between high vaginal pH, Amsels criteria and various stages of preterm labor. Neonatal complications were seen in women with preterm <34 weeks and positive for bacterial vaginosis.

Conclusion: Association between bacterial vaginosis and preterm labor was established. Screening and treatment will reduce the incidence of preterm delivery.

Key words

Preterm labor, Bacterial vaginosis, Fetal outcome, Vaginal pH.

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Introduction

Preterm labor has increasing evidence of infectious cause especially ascending infections from lower genital tract, of late attention is being given to bacterial vaginosis. In many of the case control and prospective studies bacterial vaginosis has been associated with late miscarriage, preterm labor, premature rupture of membranes, chorioamnionitis [1]. Treating bacterial vaginosis can reduce the preventable cause of preterm birth [2]. Preterm births account for 75% of perinatal deaths. The diagnosis of preterm labor includes patients at risk for preterm, early warning symptoms, fetal fibronectin > 50ng/ml and established preterm labor. Infective cause accounts for 25-40%. Bacterial vaginosis, a condition in which there is an overgrowth of Gardenalla vaginalis, Mycoplasma hominis, Mobiluncus and other anaerobes in the vagina with a corresponding decrease in number of lactobacilli. The vaginal flora has endotoxins, amines like trimethylamine which causes fishy odor. Clues cells adhere to exfoliated epithelial cells. Diagnosis is made by Amsel Criteria (any 3 out of 4) [1, 3, 4].

Material and methods

A case control study was conducted at Andhra Medical College, Obstetrics and Gynecology Department, Visakhapatnam. 120 pregnant women attending this hospital were selected. This study includes two groups of patients; study group consists of 60 and control group 60.

Inclusion criteria

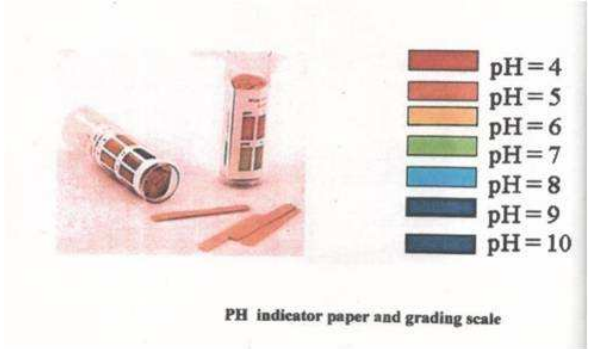
- Gestational age between 28 weeks and 37 weeks.
- Single viable fetus.
- Women with preterm labor i.e., uterine contractions occurring at a frequency of 4 in 20 min or 8 in 60 min with cervical changes effacement more than or equal to 80% and cervical dilatation > 1 cm in women with intact membranes.

Exclusion criteria

- Evidences of other obstetric complications, medical disorders, fetal or uterine anomalies, cervical encirclage and presence of vaginal bleeding.

A detailed history was taken and obstetric examination was done including speculum examination to exclude leaking membranes and to note the type of discharge. A clean and unlubricated speculum was placed in vagina. Vaginal pH was measured with pH strips. Sterile cotton swabs were used to obtain material from the posterior vaginal fornix for vaginal smear and sent to our microbiologist. The pH was measured using indicator strips with color scale. **(Figure – 1)**

Figure – 1: pH indicator paper and grading scale.



The vaginal smears were heated, fixed and subjected to gram staining and examined under magnification (1000X). A score of 0 to10 was assigned based on Nugents scoring system [5]. Clue cells were also noted on the smear. **(Figure – 2, Figure – 3)**

Diagnosis of bacterial vaginosis was done in women with pH above 4.5 and a score of 7 or more on gram staining of vaginal smear based on Nugents criteria [6]. Other parameters like maternal age, socioeconomic factor, previous

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history of preterm labor, outcome of delivery including APGAR score and weight of the baby.

Figure – 2: Unstained clue cells.

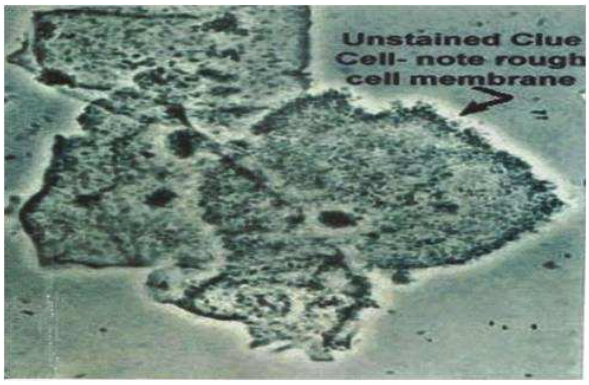
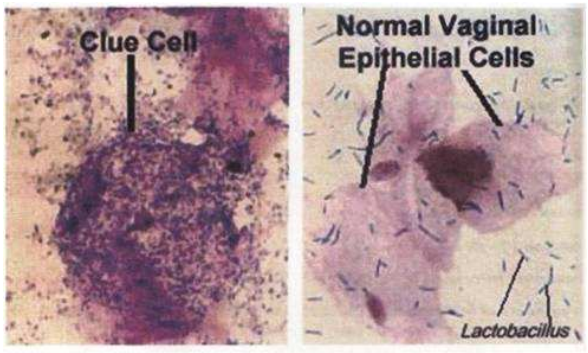


Figure – 3: Stained clue cells.



Results

Majority of subjects in two groups were in the age group of 21- 25 years and belongs to group 4 and 5 socioeconomic status. Hence, both these groups were comparable. In study group, 37 (61.6%) are primi gravidae and in controls it is 35 (58.3%) as per **Table – 1.** There were no grand multiparae. In the study group, 4.9% had given history of preterm delivery and only 1.6% in control as per **Table - 2.** 61.6% were < 34 weeks of gestation in study group. Most of the subjects in study group had pH >4.5 and ph value =<0.001 (99.9% Confidence Interval). Hence it was statistically significant. Comparison of results of gram staining bacterial vaginosis was found in 41.6% of cases of preterm labor in study group as per **Table - 3.** PH value = <0.01 was significant. Most of the babies about 91.6% are low birth weight in study group whereas only 21.6% in the control group. In study group 18.6% had APGAR <6 and in control group 100% of cases the APGAR is >7. There were 2 still births & 11 neonatal deaths in women with < 34 weeks.

Discussion

Preterm birth, low birth weight, and neonatal mortality are important problems in obstetrics. The hypothesis that ascending lower genital tract infection leads to preterm labor has been supported by many studies. Of them the most important cause is Bacterial vaginosis [7, 8]. The incidence of bacterial vaginosis in present study was 25/60 (41.6%), 10/60 (16.6%) in study and control group respectively which was compared with other studies like Renu Goyal, et al. (2004) 31.6% and 15%; Vida modares- Nejad, et al. (2008) 25% and 11.3%; Kumar Aruna, et al. (2007) 44% and 23%; etc. for study and control group respectively as per **Table – 4** [9, 10, 11, 12].

It has shown in study group that bacterial vaginosis can cause preterm labor independent of previous history of preterm delivery. Vaginal pH >4.5 is seen in 55% of cases in study group when compared to 13% in control group as per **Table - 5.** The significance of this test is tested using Chi Square test and the P value = <0.001 (99.9% Confidence interval). Hence it is noted to be significant. This study result is in concurrence with study made by Saifon Chawanpaiboon on the incidence of bacterial vaginosis in threatened preterm, advanced preterm and term labor based on Amsels criteria where the pH is > 4.5 in 68.2% of patients in threatened preterm, preterm and term labor and 70% in preterm group where as only 26.8% had PH >4.5.In term labor group and the overall incidence of bacterial vaginosis in their study was 33% [3, 13].

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The vaginal pH is a simple and effective means of diagnosing bacterial vaginosis. This test can be used in areas where facilities for gram staining are not available [14].

Conclusion

Preterm delivery is the largest contributor to perinatal morbidity and mortality throughout the world, which generates significant health care costs and any program or strategy that reduces preterm labor is likely to provide economic benefits. This study has proved the association between bacterial vaginosis and preterm labor with its adverse outcome.

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Table – 1: No of cases according to gestational age.

Gestational age in weeks	Study group (n=60)	
	No. of cases	Percentage
28-32 weeks	12	20%
33-34 weeks	25	41.6%
35-37 weeks	23	38.3%

Table - 2: No of bacterial vaginosis positive cases in preterm.

Gestational age in weeks	Total no. of bacterial vaginosis positive cases (n=25) in study group	
	No. of cases	Percentage
<34	14	56
>34	11	44

Table - 3: Results of gram staining.

Gram staining	Study group (n=60)		Control group (n=60)	
	No. of cases	Percentage	No. of cases	Percentage
Bacterial vaginosis positive	25	41.6%	10	16.6%
Bacterial vaginosis negative	35	58.3%	50	83.35%

Table – 4: Incidence of bacterial vaginosis in study and control group.

Study	Incidence of bacterial vaginosis in study group	Incidence of bacterial vaginosis in control group
Present study	25/60 (41.6%)	10/60 (16.6%)
Renu Goyal, et al. (2004) [11]	31.6%	15%
Vida Modares Nejad, et al. (2008) [12]	20/80 (25%)	9/80 (11.3%)
Kumar Aruna, et al. (2007) [13]	44/100 (44%)	23/100 (23%)
Damien Subtil, et al. (2002) [14]	13.8%	0%

Table – 5: pH values in the studied cases.

pH values	Study group (n=60)		Control group (n=60)	
	No. of cases	Percentage	No. of cases	Percentage
<4.5	27	45%	47	78.3%
>4.5	33	55%	13	21.6%

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