A study of Bacterial Vaginosis and its association with preterm labor and fetal outcome

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ABSTRACT

Introduction: Bacterial vaginosis (BV) affects 6–32% of pregnant women. BV is a risk factor for Preterm delivery and is also associated with peripartum complications such as Preterm premature rupture of membranes (PPROM), chorioamnionitis, and Postpartum endometritis. As Bacterial vaginosis in pregnancy is receiving extensive attention as a cause of preterm labour, a comprehensive prospective study was proposed to be undertaken to find out incidence of Bacterial vaginosis in preterm labour in hospital setting with simultaneous medical intervention to prevent premature birth as far as possible.

Aims Objectives: To study the incidence of bacterial vaginosis in preterm and term labour, to study association of bacterial vaginosis with preterm labour (PTL) and to study perinatal outcome in bacterial vaginosis positive cases

Materials & Methods: Fifty women who presented with preterm labour (study group) and fifty women in labour at term (control group) admitted in the Department of Obstetrics and Gynecology, Prathima Institute of Medical Sciences, Karimnagar from December 2013 to June 2015 were examined for Bacterial Vaginosis using Amsel criteria and Nugent score. Maternal age, socioeconomic status (SES), previous pregnancy outcome, onset of Preterm birth to delivery, birth weight and Apgar score were all noted. All babies of both groups followed up to first week of neonatal life.

Results: The incidence of bacterial vaginosis in patients with idiopathic preterm labour was 24 percent and among term group was 8 percent. Bacterial vaginosis was significantly (P <0.05) associated with idiopathic preterm labour. Out of 16 patients who had bacterial vaginosis, 12 had preterm delivery (<37 weeks). In 84 patients without bacterial vaginosis 38 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 and neonatal death.

Conclusion: This study shows that BV is significantly associated with preterm birth and is one of the most important causes of PTL leading to various neonatal mortality, morbidity and even permanent disability. Also prevention of PTL in pregnant women decreases the incidence of postpartum endometritis and hence reduces maternal morbidity. Methods and materials to detect bacterial vaginosis is very simple, can be carried out as outdoor procedure. If diagnosed in the early part of pregnancy and treated with antimicrobial therapy, then perhaps we can decrease the burden of prematurity which will be great benefit for society and Nation.

Keywords: Bacterial vaginosis, Preterm labour, Perinatal outcome

INTRODUCTION

Over the past several years BV has been linked to pre term labour and adverse perinatal outcome. Health care workers should monitor asymptomatic pregnant women and do the diagnostic workup and initiate early treatment[1,2,3]. In early 2001 the NIH studied the association between BV and PTL,and led to standards of recommendations which may have impact on perinatal outcome. BV can induce preterm labour, therefore the screening of high risk women for BV is recommended. Bacterial vaginosis is incriminated in the aetiology of PTL. The diagnostic criteria of bacterial vaginosis is well established. This study seeks to analyse the impact of BV on the perinatal outcome.

MATERIALS & METHODS:

In the present study 50 pregnant women in preterm labour as cases and 50 of term pregnancy as control were taken for study and follow up. Women with Singleton pregnancy,gestational age 28-36 weeks+6days,intact membranes, painful uterine contraction > 4 in 20 mins or >8 in 1hour is lasting for >40seconds,cervical dilatation 1-4cm and cervical effacement>80% were included and Gestational age <28 weeks, history of APH, UTI, RTI, diarrhoea or any other

obvious cause for PTL, medical complications of pregnancy such as PIH, diabetes, history of leaking P/V, absent membranes, multiple pregnancy, polyhydramnios, cervical incompetence, intrauterine growth restriction, intrauterine fetal death and Antibiotic therapy in last 30 days were excluded in our study[4,5,6].

On entry into the study all patients were interviewed and detail history, general, systemic and obstetrical and abdominal examination was done. Standard speculum examination and cervicovaginal sampling were performed with informed consent. Appearance of vulva, vagina, cervix and the characteristics of the vaginal fluid were recorded[7,8].

RESULTS

Total number of deliveries in this hospital from December 2013 to June 2015 was 2940 and total number of preterm deliveries were 417. Out of these cases of preterm labour admitted to this hospital, 50 cases who had preterm labour pain without any apparent detectable causes were selected as study group and 50 cases of term pregnancy were selected as control group. These cases were studied and followed up. Maximum no of PTL with BV+ve cannot be arrested (i.e. labour to delivery interval less than 24hours) from the onset of labour by means any tocolytic therapy (58% cases in BV positive cases compare to 26%cases in BV negative cases) [Table 1 & Figure 1]. Out of 12 bacterial vaginosis positive patients, 2 (13%) had extremely low birth weight infants (wt. <1.5 kg) and 7(60%) had very low birth weight babies (wt. < 2 kg). In patients without bacterial vaginosis, 1 (3%) had extremely low birth weight infants and 13(34%) had very low birth weight infants. BV is significantly associated with low birth weight babies (P <0.05) [Table 2 & Figure 2]. APGAR in preterm birth and bacterial vaginosis is shown in Table 3. Table 4 and Figure 3 shows perinatal mortality and morbidity is high in BV positive cases. 41% deaths occurred in bacterial vaginosis positive cases and 51% suffered from hyperbilirubinemia, RDS, neonatal sepsis, as compared to 13% death and 35% cases suffer from hyperbilirubinemia, RDS, neonatal sepsis in BV negative cases.

Table 1 Interval between onset of preterm labour to delivery

Interval	BV+ve (n=12)	%	BV –ve (n=38)	%	P Value
<24 hours	7	58%	10	26%	<0.05*
<1week	**3**	**26%**	**13**	**34%**	>0.5
1-2weeks	**2**	**16%**	**13**	**34%**	>0.5
2-3weeks	**0**	**0%**	**2**	**6%**	>0.5
Total	**12**		**38**		

Figure1: Interval between onset of preterm labour to delivery

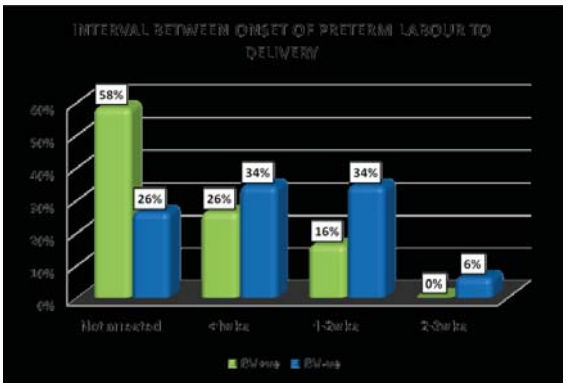

Table-2 : Birth weight in preterm birth & bacterial vaginosis

Birth weight	Preterm birth			
	BV+ve (n=12)	%	BV+ve (n=38)	%
1 – 1.5 KG	2	**13%**	**1**	**3%**
1.5 – 2 KG	7	**69%**	**13**	**34%**
2 – 2.5 KG	3	**27%**	**24**	**63%**
>2.5 KG	0	**0%**	**0**	**0%**

X^2=6.78, p<0.05

Figure 2 : Birth weight in preterm birth & bacterial vaginosis

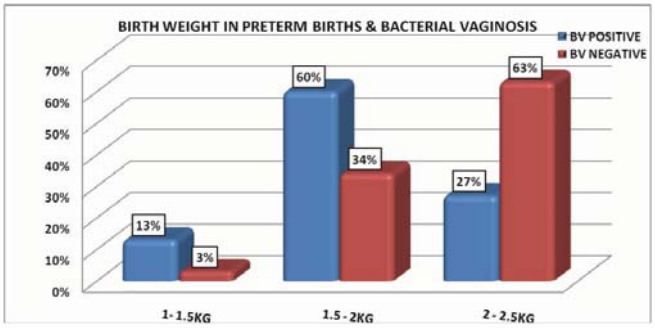

Table-3 : Apgar in preterm birth and bacterial vaginosis

APGAR	Preterm birth			
	BV+ve (n=12)	%	BV+ve (n=38)	%
0 – 3	**6**	**50%**	**9**	**24%**
4 – 7	**4**	**33%**	**12**	**33%**
7 – 10	**2**	**17%**	**17**	**45%**

Table-4 : Perinatal outcome in preterm birth & BV

Perinatal events	Preterm birth				p value
	BV+ve (n=12)	%	BV+ve (n=38)	%	
Healthy baby	1	8%	20	52%	<0.01*
Neonatal death	5	41%	5	13%	<0.05*
Neonatal septicemia	3	27%	3	9%	>0.1
RDS	2	16%	5	13%	>0.1
Hyperbilirubinemia	1	8%	5	13%	>0.1
Total	12		38		

Figure 3 : Perinatal outcome in preterm births & BV

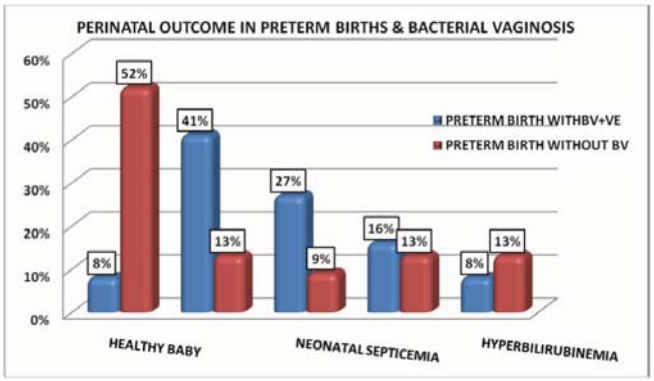

Table-5 : Perinatal outcome in term birth & BV

Perinatal events	Term birth				p value
	BV+ve (n=4)	%	BV+ve (n=46)	%	
Healthy baby	0	0%	37	80%	<0.001*
Neonatal death	1	25%	2	4%	>0.05
Neonatal septicemia	1	25%	3	7%	>0.1
RDS	2	50%	1	2%	<0.001*
Hyperbilirubinemia	0	0%	3	7%	>0.5
Total	4		46		

Table 5 shows perinatal mortality and morbidity is also high in BV positive term cases.Among bacterial vaginosis +ve cases 50% suffered from RDS, 25% from neonatal septicemia, 25% cases neonatal death observed as compared to 7% developed hyperbilirubinemia, 7% suffered from neonatal septicemia, 2% from RDS and 4% cases neonatal death was observed in bacterial vaginosis –ve cases.

Table-6 : Positive criteria for BV (Amsel)

Test	Test Results	No. of preterm cases	%	No. of term cases	%	p value
Vaginal discharge	+ve	30	60%	6	12%	0.001*
	-ve	20	40%	44	88%	0.001*
vaginal PH	>4.5	20	40%	8	16%	0.0034*
	<4.5	30	60%	42	84%	0.0034*
Whiff test	+ve	17	34%	6	12%	0.0078*
	-ve	33	66%	44	88%	0.0078*
Clue cell	+ve	22	44%	10	20%	0.0052*
	-ve	28	56%	40	80%	0.0052*

Table 6 shows that thin homogenous vaginal discharge in 60% cases of preterm group compared to 12% in term group. Vaginal Ph >4.5 is present in 40% cases in preterm group and 16% in term group. Whiff test is positive in 34%cases in preterm group and 12% in term group. Similarly clue cells are found 44% in preterm group and 20% in term group. Sensitivity of Amsel test is 66% and specificity is 94%. Amseltest is positive in 20% cases of preterm group where as 6% cases are positive in term group. Amsel test is negative in 80% cases in preterm group and 94% cases are negative in term group. This is statistically significant [Table 7].

Table-7 : Comparison of Amsel test between Preterm group and Term group.

Test	No. of Preterm cases	%	No. of Preterm cases	%
Amsel +ve	10	20%	3	6%
Amsel –ve	40	80%	47	94%
Total	50		50	

X^2=4.332, p<0.05

Nugent test is positive in 24% of cases in preterm group and 8% in term group. Similarly Nugent test is negative in 76% of cases in preterm group and 92% in term group. This is statistically significant [Table 8]

Table 8 : Comparison of Nugent test between Preterm and Term pregnancy:

Test	No. of Preterm cases	%	No. of term cases	%
Nugent +ve	12	24%	4	8%
Nugent –ve	38	76%	46	92%
Total	50		50	

X^2=4.76, p<0.05

DISCUSSION

Although the introduction of new pharmacological agents to treat PTL has given some optimism for several decades, prematurity rate has remained relatively constant at approximately 7-10% of all births in developing countries like India.

The incidence of preterm labour in the present study was 14.2%. This rate of PTL was due to inability to recognize PTL early enough to treat as an aetiology is frequently unknown. Also there is minimal signs and symptoms which causes most of patient to seek medical care too late for the intervention for PTL[9,10].

The incidence of PTL is higher among unbooked cases (64%), where as in booked cases it was 36% only (p<0.05). Unbooked cases are deprived of getting medical care for risk factors which may affect the complications of pregnancy leading to PTL. PTL was found to be more in age group 21-25 years which is 56% as compared to 36% in term labour (p=0.0448), this is statistically significant in our study. Of all preterm deliveries, 82% occurred before 25 years of age. Maximum number of cases of preterm labour (77.33%) with maternal age between 22 and 35 years were detected while studying the role of Nifedipine in suppression of PTL. SES is another factor for preterm labour. PTL was found to be more in low SES group , which was 60% compared to 30% of patient in low SES in term labour in our study followed by middle SES (32%) & lowest in the high SES (8%) . P<0.05, this is statistically significant[11,12,13].

SES means poor nutrition and hypoproteinemia. Poor nutritional status, long duration of stressful work etc are also responsible for PTL[14,15]. Preterm birth occurred in 46% of cases in gestational age of 32-34 weeks followed by 28% in 28-30 weeks in our study. Maximum number of cases (46% belonged to 32-34 weeks and 14% cases belonged to 30-32weeks and hence 60%) of PTL cases belonged to 30-34 weeks[5, 7].

More number of anemic patients who had PTL were found to be bacterial vaginosis positive (75%) compared to those who were non anaemic (25%). Maximum number of PTL with BV+ve(58%) cases could not be arrested by tocolytics once labour process had started compared to only 26% in BV-ve cases (p<0.05), also those who cannot be arrested at the time of onset of labour usually deliver at a shorter interval of time compared to BV –ve women.

Amsel criteria :

Vaginal discharge is an important criteria for diagnosis of BV in Amsel criteria. In our study 60% of cases were found to be positive and rest 40% had no discharge (p=0.001)[5, 6].

In our study 20% cases were found to be Amsel positive who satisfied three of four Amsel criteria (p<0.05). 80% of cases are found to be Amsel negative who did not satisfy three out of four criteria. Hence according to Amsel prevalence of bacterial vaginosis is 20%. 6% of cases of term pregnancy are also found to be Amsel positive and 94% of term pregnancies were found to be Amsel negative. Amsel test is positive in 20% of the cases of preterm group compared to 6% cases in term pregnancy group (p<0.05) which is statistically significant. Amsel test is negative in 80% of cases of preterm group compared to 94% negative in term group (p<0.05).

Nugent's criteria:

24% of cases are found to be gram positive and the rest 76% are gram stain negative and hence the prevalence according to Nugent criteria is 24% which is within the normal range (10-35% according to Goldmen and Hetch 2000). 8% of the term pregnancies are also gram stain positive but 92% are gram negative in term pregnancy group[4,6]. Nugent test is positive in 24% of cases of preterm group compared to 8% in term group (p<0.05) which is statistically significant. Nugent test is negative in 38% of cases in preterm group compared to 92% in term group (p<0.05). Sensitivity of Nugent test is 80% and specificity is 90%[10,11].

CONCLUSION

From this study it is clearly evident that BV is one of the most important causes of PTL leading to various neonatal mortality, morbidity and even permanent disability. Also prevention of PTL in pregnant women decreases the incidence of postpartum endometritis and hence reduces maternal morbidity.

REFERENCES

1. Thomson JL. Gelbartsm, Broekhuizen FF. Advances in the understanding of bacterial vaginosis. J Reprod Med. 1989;34:581-7.
2. 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.
3. Marrazzo JM. Evolving issues in understanding and treating bacterial vaginosis. Expert Review of Antiinfective Therapy 2004; 2:913–22.
4. Fredricks DN, Marrazzo JM. Molecular methodology in determining vaginal flora in health and disease: its time has come.Curr Infect Dis Rep 2005; 7:463–70.

5. Carey J C &Klebanoff et al, change in vaginal flora associated with an increased risk of preterm birth; American journal of Obstetrics and Gynaecology 2005:192:1341-6.

6. Cunningham J H, Leveno K J, Bloom S L, Hauth J C: preterm birth in Williams Obstetrics 23rd edition, McGraw Hill 2009:804-27.

7. ACOG- practice bulletin: Clinical management guidance for Obstetrics and Gynaecology, year 1995.

8. DesaiVA, Verma R, Mann PP. Bacterial vaginosisin patients with idiopathicpretermlabour. J ObstetGynacol India 2009; 59(1):53-7.

9. Sirohiwal D, BanoA,Sachan A: tocolysis with retodrine and duvadilon, A comparative study on preterm labour, 2001; 76:66-67.

10. Goldenberg et al, mercer B M et al: preterm prediction study, multiple marker test for preterm labour: American journal of Obstetrics and Gynaecology 2002: 184:643-51.

11. Crohn MA, Hiller SL, Eschanbach DA: comparison of methods of diagnosis of bacterial vaginosis in pregnant women : clinical microbiology 1989, 27: 1266-71.

12. Hiller SL,Mcdharsen et al: vaginal microflora associated bacterial vaginosis in Japanese &thai pregnant women, clinical infectious disease:1996:23:748-52.

13. Goldman MB, Hatch MC, Vaginal infections In Women and health: Academic Press, 2000.

14. Gardner and Duke et al: premature delivery, a risk factor for neonatal complication, journal report, med 41:903:1996.

15. Purwar M, Ughade S, Bhagat B, et al. Bacterial vaginosis in early pregnancy and adverse pregnancy outcome. J ObstetGynecol Res 2001; 27:175–81.

Please cite this article as: Usharani, Vivekanand,Suvarna. A study of Bacterial Vaginosis and its association with preterm labor and fetal outcome. Perspectives in medical research 2016;4:2:39-43.

Sources of Support: Nil,Conflict of interest:None declared