

BACTERIAL VAGINOSIS AND PRETERM LABOUR

Meaad Kadhum Hassan, Hayfa Al-Shaheen & Jehan Majeed Al-Mukh

ABSTRACT

*This prospective case control study was carried out over a nine-month-period (from 1st of April until the end of December 2002) in Basrah maternity & children hospital to assess the association between bacterial vaginosis and preterm labour & to compare it with those who delivered at term. Data were collected & analyzed on 179 women in spontaneous labour. Seventy two with preterm labour (cases) & one hundred seven at term (controls). This study has confirmed that *Gardnerella vaginalis* was the commonest bacterial pathogen isolated from women with preterm labour, it was detected in 17 out of 72 women with preterm labour (23.6%) in comparison to 2 of 107(1.9%) women who delivered at term (P value <0.01), followed by group *B. streptococci* in 4(5.5%), *E. coli* in 2 (2.8%), *Proteus* in 1(1.4), *Streptococcus fecalis* in 1(1.4%) & *N. gonorrhoea* in 1(1.4 %). In addition to bacteria listed above, *Trichomonas vaginalis* was detected in 4(5.5%) of women with preterm labour. The state of membranes were studied and it was found that 72.3% of women with preterm labour had premature rupture of the membranes in comparison to 39.2% of control (P : < 0.001), while the frequency of sexual contact was not statistically different among both groups. It can be concluded from these results that bacterial vaginosis was detected in a significant number of women with preterm delivery and premature rupture of the membranes, screening for bacterial vaginosis is recommended and further studies are required to evaluate the treatment of bacterial vaginosis and its role in the reduction of preterm birth.*

INTRODUCTION

Bacterial vaginosis (BV) is the most common lower genital tract infection encountered among women of reproductive age.^[1,2] In some populations its prevalence is greater than 50%.^[2] It is thought to represent a disturbance of the vaginal ecosystem in which the usually dominant lactobacilli are overwhelmed by an overgrowth of predominantly anaerobic organisms including, *Gardnerella vaginalis*, Bacteroids spp., *Mycoplasma hominis* and is now believed to be due to comma shaped organisms named Mobiluncus, these organisms are believed to be sexually transmitted.^[2,3] Antepartum bacterial vaginosis in pregnancy has been related to premature delivery, the recovery of microorganisms from amniotic fluid of women in premature labour with intact membranes, to histologic chorioamnionitis and to the recovery of microorganisms from the placenta.^[4-7] In addition, bacterial vaginosis is associated with maternal infectious morbidity during labour and in the postpartum period.^[4] Little is known of the pathophysiological mechanisms by which bacterial vaginosis may cause preterm labour and /or premature rupture of the membranes. Many studies had found that selected bacteria may play a role in the initiation of uterine contractions by increasing the level of cytokines

which can increase prostoglandins production which are the final pathway for cervical ripening and onset of labour.^[2,4,6] This study was carried out to assess the association between bacterial vaginosis and preterm labour and to compare it with those who deliver at term.

PATIENTS AND METHODS

In this prospective case- control study we studied the correlation between bacterial vaginosis during pregnancy and preterm labour. The study was conducted over 9 month's period (from the 1st of April 2002 till the end of December 2002) on women attending the delivery room of Basrah Maternity and Children Hospital. There were 6061 deliveries during the study period. One hundred seventy nine women were randomly selected, 72 with premature labour. All women were examined by the same obstetrician and the following information's were obtained; name, age, parity, educational level, date of LMP, frequency of sexual contact, history of previous preterm delivery and maternal illnesses. Women with cervical incompetence and medical illnesses known to be risk factors were excluded. All women were examined thoroughly; ultrasound was done for them to confirm gestational age (in addition to

LMP) and to exclude congenital malformations of the fetus. Patients were evaluated carefully for any sign of chorioamnionitis (abdominal pain and tenderness, tachycardia, temperature >38°C, offensive vaginal discharge, and hot feeling of vagina).^[8] No patient was found with chorioamnionitis. The diagnosis of premature rupture of the amniotic membranes was made by observing amniotic fluid pooled in the posterior fornix, on bivalve speculum examination.^[1] Pelvic examination was performed in the labour room under full aseptic technique, high vaginal swab for gram stain was obtained after using bivalve speculum, and the state of amniotic membranes was recorded, Vaginal swabs were examined by wet preparations, gram stained smears were prepared and read by the same bacteriologist. Bacteriological methods included culture on blood agar, MacConkey agar, Sabouroud s agar and chocolate agar which were incubated at 37C

for 48 hours. All neonates were examined following delivery by pediatric resident. The body weight was recorded and gestational age was assessed using Dubowitz criteria.^[9] All women included were delivered by normal vaginal delivery. Statistical analysis was done utilizing χ^2 and, P-value <0.05 was considered to be significant.

RESULTS

One hundred seventy nine women were included in this study, 72 of them with preterm labour. Maternal characteristics are presented in (Table-1). There were statistically no significant differences in the age and parity of women with preterm and full term delivery. However, higher percentage of women with preterm delivery was illiterate compared to those who delivered at term although the difference was statistically not significant (P-value > 0.05).

Table 1. *Selected Soci-demographic Maternal Characteristics.*

Age	Preterm No. 72		Control No. 107		P – value
	No.	%	No.	%	
<20 years	5	7	9	8.4	> 0.05 NS
20-30	34	47.2	49	46	
31-40	26	36.1	43	40	
> 40	7	9.7	6	5.6	
<i>Parity</i>					
< 2	41	57	57	53.2	> 0.05 NS
3-5	19	26.4	32	30	
> 5	12	16.6	18	16.8	
<i>Educational level</i>					
Illiterate	20	27.8	17	15.9	> 0.05 NS
Primary	35	48.6	59	55.1	
Secondary	14	19.4	20	18.7	
Higher	3	4.2	11	10.3	

Culture proven *Gardenella vaginalis* was detected in 17 out of 72 women with preterm delivery (23.6%) and in 2 of 107 women who delivered at term(1.9%), the difference between the two groups was statistically significant (P-value <0.01). As presented in (Table-2), *Gardnerella vaginalis* was the commonest bacterial pathogen isolated from women with preterm delivery, followed by klebsiella in

5(7%), and group B streptococci in 4(5.5%) of women with preterm delivery. Other bacteria isolated were *E. coli* in 2 (2.8%), proteus from 1(1.4%), *Streptococci faecalis* in 1(1.4%) and *N. gonorrhoea* from one woman (1.4%). In addition to bacteria Trichomonas vaginalis was detected in 4(5.5%) of women with preterm delivery.

Table 2. *Distribution of vaginal pathogens among women with preterm and full term delivery.*

Causative microorganism	Preterm		Control	
	No	%	No	%
Group B streptococci	4	5.5	2	1.9
Klebsiella	5	7	1	0.9
Gardnerella Vaginalis	17	23.6	2	1.9
Trichomonas. Vaginalis	4	5.5	2	1.9
E . Coli	2	2.8	5	4.7
Proteus	1	1.4	1	0.9
Streptococci Faecalis	1	1.4		
N.Gonorrhae	1	1.4		
Candida	4	5.5	7	6.5
Normal Flora	33	45.8	87	81.3
Total	72	100 %	107	100 %

P. Value < 0.01 (Frequency of bacterial vaginosis in preterm and full term delivery)

E. coli was the commonest bacteria isolated from women who had delivered at term 5(4.7%), (Table-2). The frequency of sexual contact / week was studied and it was found that

there was no statistically significant difference among both groups of women (P-value >0.05) as illustrated in (Table-3).

Table 3. *Frequency of sexual contact among studied women.*

Frequency of sexual contact	Preterm		Control	
	No.	%	No.	%
Once /wk	38	52.7	52	48.6
2 /wk	20	27.8	31	29
≥ 3 / wk	14	19.5	24	22.4
Total	72	100	107	100

P-value > 0.05, not significant

The state of amniotic membranes on admission to delivery room was investigated. Fifty two women (72.3%) of women with preterm delivery had rupture of membranes compared to 42 (39.2%) of women who had delivered at

term. This result was statistically significant (P-value <0.001), (Table-4). In addition to that 11 women (15.3%) with preterm delivery gave history of previous preterm delivery, compared to 6(5.6%) women in the control group.

Table 4. *State of the membranes in both groups.*

State of the membranes	Preterm (72)		Control (107)		P-value
	No.	%	No.	%	
Membranes ruptured	52	72.3	42	39.2	P= 0.001 (S)
Membranes intact	20	27.7	65	60.8	

S = Significant

DISCUSSION

Although it was previously regarded as a harmless condition, bacterial vaginosis has been considered to be a risk factor for preterm labour.^[1,10,11] In this prospective study the vaginal flora of 72 women with preterm labour were compared with that of 107 controls. In addition to that, selected demographic factors (age, parity, educational level), frequency of sexual contact and state of amniotic membranes on admission to hospital were studied. *Gardenerlla vaginalis* was present in 23.6% of women with preterm delivery, compared to 1.9% of controls (P-value <0.01). These results are comparable to other studies in USA^[6] and Sweden^[12] and our results were lower than that of a study done in Japan where bacterial vaginosis was reported in 51.5% of women with preterm labour.^[13] Other bacterial pathogens isolated on culture from women with preterm

labour were *klebsiella* in (7%), and followed by *group B streptococci* (5.5%), while *E. Coli* was the commonest bacterial pathogen isolated from women who had delivered at term (4.7%). Bacterial vaginosis associated microorganisms i.e. *Mobilluncus*, *prevotella*, *peptostreptoco*, *fusobacterium nucleatum*, and *Gardnerella vaginalis* were found to be significantly associated with preterm labour,^[1,6,12,14] and even some studies recommended the use of metronidazole for pregnant women with bacterial vaginosis to decrease the risk of preterm labour associated with bacterial vaginosis.^[5,11,15] This study also has revealed that coitus is not related to bacterial vaginosis and does not predispose to preterm labour, this is in agreement with other studies.^[16] Of the 72 women with preterm labour, 52(72.3%) had premature rupture of the membranes, this result

is higher than that reported by Mikamo H et al, and Mc Gregor JA et al who reported premature rupture of the membranes in 41.5% and 50% of women with preterm delivery respectively.^[13,14] As bacterial vaginosis was detected in a significant number of women with preterm delivery, screening for bacterial vaginosis is recommended and further studies are required to evaluate the treatment of bacterial vaginosis and its role in the reduction of premature rupture of the membranes and preterm birth.

REFERENCES

1. Kimberlin DF, Andrews WW. Bacterial Vaginosis: association with adverse pregnancy outcome. *Semin perinatol.* 1998; 22(4): 242-245.
2. Perinatal infection In: *Obstetrics by ten teachers.* Stuart Carpbell, Shristoph Lees (eds.). 17th edition. Arnold Co., 2000; 226-227.
3. Maclean AB. Benign diseases of the vagina, cervix and ovary. In: Keith Edmonds (ed.). *Dewhursts Textbook of Obstetrics and Gynecology.* 6th edition. Black Well Science Co. 1999; 582.
4. Martius J, Eschenbach DA. The role of Bacterial Vaginosis as a cause of amniotic fluid infection. *Arch Gynec Obstet* 1990; 247 (1): 1-13.
5. Mc Donald HM, O Laughlin JA, Vigneswaran R, et al. Bacterial Vaginosis in pregnancy and efficacy of short-course oral metronidazole treatment; a randomised controlled trial. *Obstet Gynecol* 1994; 84 (3): 343-348.
6. Hill GB. Preterm birth: associations with genital and possibly oral microflora. *Ann. Periodontol.* 1998; 3 (1): 222-232.
7. Mass SB, Brennan JP, Silverman N, et al. Association between a shift in vaginal flora on papanicolaou smear and acute chorioamnionitis and preterm delivery. *Diagn-Cytopathol.* 1999; 21(1): 7-9.
8. Stear PJ. Preterm labour. In: Keith Edmonds (ed). *Dewhurst textbook of Obstetrics and Gynecology.* 6th edition. Black well science Co 1999; 296.
9. Stoll BJ, Kliegman RM. The fetus and the neonatal infant. In: Behrman RE, Kliegman RM, Jenson HB (eds). *Nelson textbook of Pediatrics.* 16th edition, W.B.Saunders Co. Philadelphia 2000:463-464.
10. Platz-Christensen JJ, Pernevi P, Hagmar B, et al. A longitudinal follow up of bacterial vaginosis during pregnancy. *Acta Obstet Gynecol Scand* 1993; 72(2): 99-102.
11. Deborah CM, Boyle Paul E, Adinkra. Bacterial vaginosis. In studd G (ed.). *Progress in Obstetrics & Gynaecology: Volume 15.* Churchill Livingstone 2003; 202.
12. Holst E, Goffers AR, Andersch B. Bacterial Vaginosis and vaginal microorganisms in idiopathic premature labour and association with pregnancy outcome. *J clin. microbiol* 1994; 32(1): 176-188.
13. Mikamolt H, Satu Y, Havasaki Y, et al. Bacterial isolates from patients with preterm labour with and without preterm rupture of fetal membranes. *Infect. Dis. Obstet Gynecol* 1999; 7(4): 190-194.
14. Mc Gregor JA, French JF, Richter R, et al. Antenatal microbiologic and maternal risk factors associated with prematurity. *Am J Obstet Gyneol* 1990; 163 (5 pt1): 1465-1473.
15. McCoy MC, Katz VL, Kuller JA et al Bacterial vaginosis in pregnancy; an approach for the 1990, *Obstet. Gynecol surgery* 1995; 50(6): 482-488.
16. Kurki T, Ylikortak O. Coitus during pregnancy is not related to Bacterial vaginosis or preterm birth. *Am J. Obstet. Gynecol,* 1993; 169 (5): 1130-1134.