Original Article

Bacterial Vaginosis and Premature Uterine Contraction among Women in Ramadi City

Wassan A.H. Al-Jobori* DGO

Fac Med Baghdad 2008; Vol.50, No.1
Received Feb. 2007

Summary:

Background :

To study the incidence of premature uterine contraction (PUC) with bacterial vaginosis (BV) in Ramadi city and to correlate the incidence of (PUC) with severity (grades of BV).

Patients and Methods:

A prospective study was performed involving 250 women who consecutively attended Gynecological ward in Maternity and Child Hospital. 150 women were control groups (without uterine contraction), and 100 women were regarded as patients group (with uterine contraction) at 28-34 weeks of gestation. BV was diagnosed on the basis of four diagnostic criteria; vaginal pH>4.7, homogenous vaginal discharge, a positive Whiff test, and the presence of clue cells.

Results:

A total of 250 high vaginal specimens, BV were diagnosed in 74% of cases with PUC (patient group); the incidence was 8% in grade I (GI), 29% in GII, and 37% in GIII. BV was 10% of cases without uterine contraction (control group).

Conclusions:

There was statistically significant correlation between BV and PUC up to 74%. The incidence and severity of PUC increased with increasing the severity of BV. The patients who used more IUCD (intrauterine contraceptive device), higher reproductive ability, used vaginal douching, and have history of PID (pelvic inflammatory disease) are more liable to have BV and more liable to have PUC.

Keywords: bacterial vaginosis (BV), premature uterine contraction (PUC).

Introduction:

Preterm delivery is the chief problem in obstetric, accounting for 70 percent of perinatal mortality and nearly half of long term neurological morbidity 1,2. Approximately 10 percent of all birth are preterm, but most of the serious illness and death is concentrated in the 1 to 2 percent of infants who are born at less than 32 weeks of gestation and who weigh less than 1500 gm. Approximately 20 percent of preterm births are the result of a physician's decision to bring about delivery for maternal or fetal indications, and the remainder follow the spontaneous onset of labor or rupture of the membranes 3. The rate of preterm delivery has not decreased in the past severe decades 4; but the survival rate of infants delivered prematurely has increased so that 80 percent of infants weighing 500 to 1000 gm now survive 5.

Bacterial vaginosis (BV) is the most common vaginal infection in women of child bearing age, it is sometimes accompanied by discharge, odor, and pain, itching or burning. It is caused by imbalance in the bacteria that are normally found in a woman's vagina 5,6. The vagina normally contains mostly "good" bacteria, and fewer "harmful" bacteria. BV develops when there is a change in the

**Dep. Of Gynecol. And Obstet., College of Medicine, Al-Anbar University.*

environment of the vagina that causes an increase in harmful bacteria 7. These harmful bacterial lead to many complications like increase susceptibility to HIV, pelvic inflammatory disease (PID), and pregnancy complications 8,9.

The diagram below shows potential pathways from choriodecidual bacterial colonization to preterm delivery (mechanism of uterine contraction with BV).

Patients and Methods:

Two hundred and fifty pregnant women attend Maternity and Child Hospital in Ramadi city of different parity status. Their ages were between 16-42 years old (mean 28). Some of them were with history of preterm labor, and others were not. All were pregnant between 28-34 weeks of gestation, 100 of them were cases of PUC that have no risk factor for PUC, they regarded as cases and 150 were of no uterine contraction and they regarded as control group. All complained of genital malodor and/or abnormal vaginal discharge.

This study was performed from May, 2004 to June, 2005. Vaginal discharges were obtained from posterior, fornix by disposable cotton swab with the help of a sterile bivalve speculum in lithotomy position with good light. Samples were obtained, forwarded to the same hospital laboratory, then the following are assessed: vaginal pH, Whiff amine test (defined as the presence of a fishy odor when 10% of KOH) is added to vaginal discharge 11,12, Clue cells in wet mount preparations, and the characteristic homogenous adherent vaginal discharge 13. If at least three of the preceding criteria laid down by Amsel 1983 14 and published by national guideline for the management of BV 15 were present is diagnosed as BV. This diagnosis was further strengthened by microscopy of stained smear (Gram stain) and culture of vaginal discharge.

The culture was done for anaerobic, aerobic, facultative anaerobic, and yeast fungi. The culture for anaerobic bacteria were made on anaerobic blood agar plates and incubated in 72 hr at $37^{O}C$ in an anaerobic gas pack system. Cultures for aerobic and facultative anaerobic bacteria were made in blood agar in an atmosphere of 10% CO_2, yeast fungi were cultured on Sabouraud's agar, incubated for 72 hr at $37^{O}C$.

According to wet mount preparation, the bacterial vaginosis divided into three grades:

1. GI: if harmful bacteria percentage is 10-20% (mild BV).
2. GII: if harmful bacteria percentage is 30-50% (moderate BV).
3. GIII: if harmful bacteria percentage is 60-80% (severe BV).

Results:

Table 1: The distribution of the PUC according to the presence of bacterial vaginosis

		PUC		Total
		No	Yes	
B.V.	G0	104	26	130
	GI	28	8	36
	GII	12	29	41
	GIII	6	37	43
Total		150	100	250

Chi-Square = 80.53, df=3, P=0.000

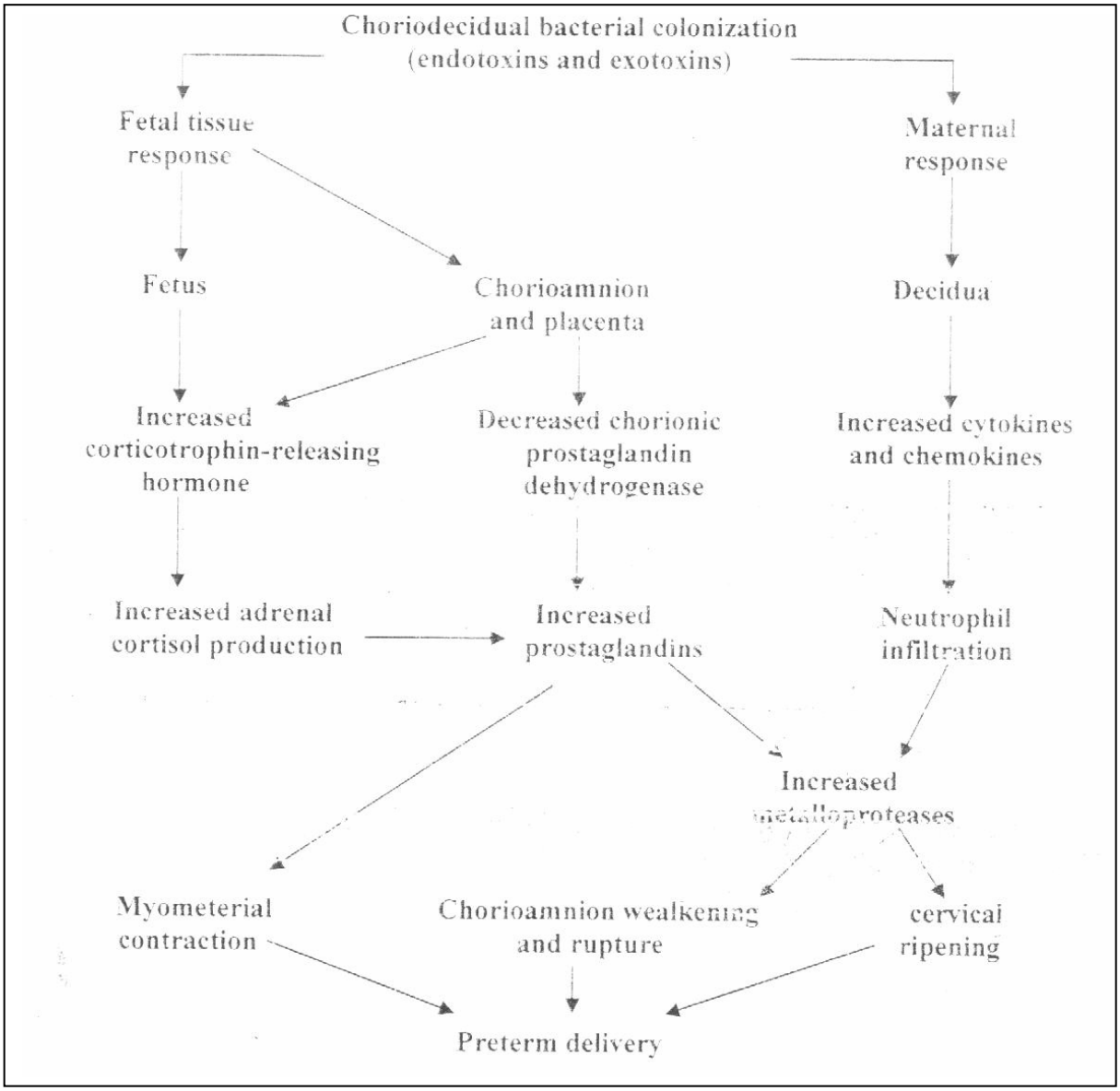
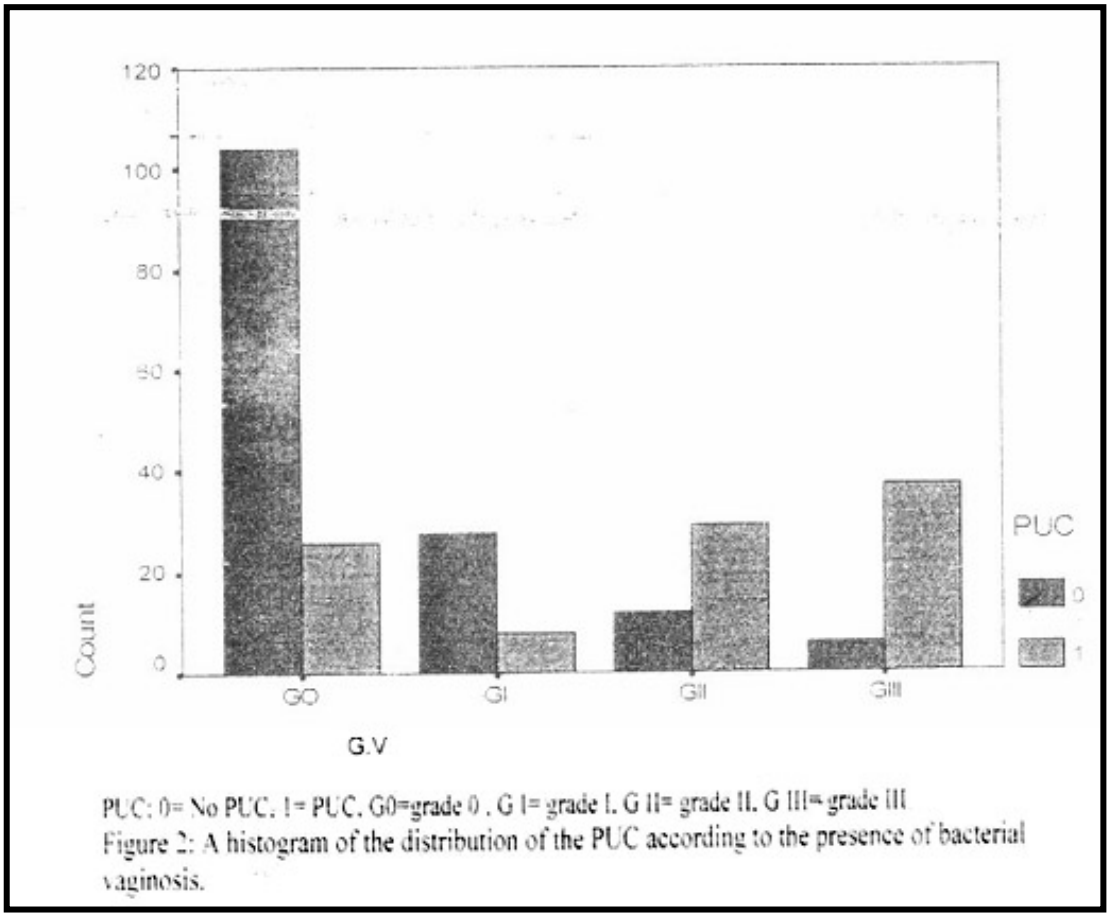


Figure 1: Potential pathways from Choriodecidual bacterial colonization to preterm delivery [10]

According to table 1, out of 100 total patients, 26 patients in G0 (26%) were with no BV and 74 patients (GI+GII+GIII) were with BV. BV is 8% in GI and 66% in GII and GIII. So BV was of high incidence among patient group. From 150 women control group, 104 (69%) were with no BV and 46 women (GI+GII+GIII) (31%) were with BV and 132 (88%) in G0 and GI and 18 (12%) in GII and GIII. There was statistically striking significant correlation between BV and PUC ($P<0.001$). This result indicates that BV is significantly more prevalent among cases of PUC which might be a precipitating factor for such cases.



PUC: 0= No PUC, 1= PUC, G0=grade 0 , G I= grade I, G II= grade II, G III=grade III

Figure 2: A histogram of the distribution of the PUC according to the presence of bacterial vaginosis.

Table 2: PUC, B.V. crosses tabulation

		B.V.		Total
		G0 & GI	GII & GIII	
PUC	No	132	18	150
	Yes	34	66	100
Total		166	84	250

Table 3: Risk Estimate

	Value	95% Confidence Interval	
		Lower	Upper
Odds ratio for PUC	14.235	7.482	27.083
N of valid cases	250		

Discussion:

Preterm labor is defined as labor which occurs from 24-28 weeks of gestation. It is of high incidence which is influenced by sociological and epidemiological factors. Age factors i.e., it is more in young and older age groups 15,16. The risk increased with history of preterm labor, incidence is higher with antepartum hemorrhage, heart disease, systemic infection, polyhydramnios, and cervical incompetence, and multiple

pregnancies. It is diagnosed by regular painful uterine contractions that can be recorded on cardiogram, spontaneous rupture of membranes, progressive cervical dilatation, and fibronectin secreting 15,16.

It carries high material and perinatal mortality and morbidity including: the mother who has delivered a premature baby will be anxious, and may also have the physical complications of an operative delivery or infection, she need considerable psychological support.

Preterm baby have high risk of respiratory distress syndrome, feeding problem, and electrolyte disturbances, need neonatal care unit, risk of fluid replacement and antibiotics 16.

It is managed by rest, tocolytics, B-sympathomimetics, magnesium sulphate, indomethacin, and calcium channel blockers that carry risk of fluid overload myocardial ischemia, hyperglycemia and hypokalemia 16.

Indomethacin carry maternal risk if peptic ulcer, thrombocytopenia, GIT bleeding, and fetal complications of pulmonary hypertension, necrotizing enterocolitis, cardiac arrest, and low therapeutic ratio 16.

Since BV plays role in causing uterine contraction and cervical dilatation as mentioned in figure 1, it can be treated by antibiotics like metronidazole and clindamycin which have no teratogenicity (as mentioned latter on). Since its incidence is high in our women due to: higher incidence of PID 16, although the incidence of BV is higher in those women but there are no prospective studies investigating whether treating a symptomating BV reducing the risk of developing PID 17,18. It is also because of higher reproductive activities 18, and higher using of IUCD 18. In some studies they found higher incidence of BV in certain racial groups, higher incidence in women using vaginal dough 19.

Out study showed that how statistically significant the relation between bacterial vaginosis in grades with frequency and severity of uterine contraction 20. According to these results (table 1), we assumed that bacterial vaginosis (GII) is the cut-off point to consider, this infection as a significant precipitating factor for PUC cases. The risk estimate tests (Odds ratio) revealed that those who are infected with GII bacterial vaginosis are about 14 times more prone to suffer from PUC than those without such infection 21.

Compared to other recent studies done by CAssell et al, and 22 Yoshida et al. 23 that showed incidence of 40% uterine contraction in Uganda, while Cauci et al. 24 showed of 12% uterine contraction in U.K.; 2% in GI, 6% in GII, and 4% in GIII. They had been followed and treated by antibiotics (metronidazole and clindamycin), and showed high percentage of contraction of pregnancy to term 24.

Our study conclude that the incidence of bacterial vaginosis among our women is high compared to other studies and significantly related to premature uterine contraction that increased with increased grades or severity of vaginosis.

This study recommends to be continued by giving the patients antibiotics (metronidazole and clindamycin) to assume the recovery rate among them.

The recommended regimens 25:

Metronidazole 400-500 mg twice daily for 5-7 days

Or

Metronidazole 2 g immediately.

Alternative Regimens:

Intravaginal metronidazole gel (0.75%) once daily for 5 days

Or

Intravaginal clindamycin cream (2%) once daily for 7 days

Or clindamycin 300 mg twice daily for 7 days.

All these treatment have been shown to achieve cure rates of 70-80% after 4 weeks in controlled trials using placebo or comparison with oral metronidazole 26.

Using antibiotics in treating PUC have lesser side effect than other mode of treatment like tocolytics agent which carries risk of material tachycardia, hypotension, and fetal electrolyte disturbance 26.

Agonist receptors are suppressed at 33-34 weeks gestation by oxytocin receptors, so need high dose with little effect 26.

Antiprostaglandins have fetal cardiac side effects especially if given after 32 weeks gestation 26.

Ca-channel blockers are with maternal and fetal side effects. So use of antibiotics is cheaper, easily available, and easily used by mother without teratogenicity 26.

References:

1. *French JI, Mcgregor JA, Draper D, Parker Mcfee J. Gestational bleeding, Bacterial vaginosis, and Common Reproductive tract infections: Risk for preterm Birth and Benefit of Treatment. Obstet Gynecol 1999; 93: 715-724. [Abstract] [Full Text].*
2. *Kekki M, Kurki T, Pelkonen J, Kurkininraty M, Caciatore B., Paavonen J. Vaginal Clindamycin in Preventing Preterm Birth and Peripartal Infections in Asymptomatic Women with Bacterial Vaginosis: A Randomized, Controlled Trial. Obstet. Gynecol 2001; 97: 634-48. [Abstract] [Full Text].*
3. *Yudin MH, Landers DV, Meyn, L, Hillier SL. Clinical and Cervical Cytotoxine Response to Treatment with Oral or Vaginal Metronidazole for Bacterial Vaginosis During Pregnancy: A Randomized Trial. Obstet Gynecol 2003; 102: 527-34. [Abstract] [Full Text].*
4. *Delaney ML, Onderdonk AB. Nugent Score Related to Vaginal Culture in Pregnant Women. Obstet Gynecol 2001; 98: 79-84. [Abstract] [Full Text].*
5. *Reid G, Bruce AW. Urogenital infections in women: Can probiotics help? Postgrad Med J 2003; 79: 428-432.*
6. *McDonald HM, O'Loughlin JA, Vigneswaran R, et al. Impact of metronidazole therapy on preterm birth in women with bacterial vaginosis Flora (Gardenella Vaginalis).*
7. *Centers for Disease Control and Prevention. Guidelines for treatment of sexually transmitted diseases. MMWR 1998; 47: 1-118.*
8. *Reid G, Bruce AW. Review of premature birth and subclinical infection. Am J 2003; 1515-28.*
9. *Morris MC, Rogers PA, Kinghorn GR. Is bacterial vaginosis a sexually transmitted disease? Sex Transm Infect 2001; 77: 63-68.*
10. *Hay PE. Therapy of Bacterial Vaginosis. J Antimicrob Chemothre 1995; 41: 6-9.*
11. *Goldenberg RL, Hauth JC, Anderws WW. Intrauterine infection and preterm delivery. N Engl J of Med 2000; 18: 1500-07.*
12. *Carey JC, Klebanoff MA, Hauth JC, Hillier SL, Thom EA, Ernest JM, Heine RP, Nugent RP, Fischer ML, Leveno KJ, Wapner R, Varner M, Trout W, Moawad A, Sibai BM, Miodovnik M, Dombrowski M, O'Sullivan MJ. The National Institute of Child Health Human Development. Metronidazole to prevent preterm delivery in pregnant women with a symptomatic bacterial vaginosis. N Engl J Med 2000; 342: S34-S40.*
13. *Romero R, Mazor M, Sepulveda W. Preterm labor: an intra-uterine inflammatory response syndrome? J Reprod Immunol 2001; 36: 93-109.*
14. *Lamount RF, Duncan SLB, Mandal D, Bassett P. Intravaginal Clindamycin to reduce Preterm Labor in Woman with Abnormal Genital Tract Flora. Obstet Gynecol 2003; 101: S16-S22.*
15. *Kilic AO, Pavolova SI, Aplay S, Kilic SS, Tao L. Comparative study of vaginal lactobacillus phages isolated from women in the United States and Turkey: Prevalence, Morphology, Host Range, and DNA Homology. Clin Diag Lab Immunol 2001; 8: 31-39.*
16. *Lay PE. Therapy of bacterial vaginosis. J Antimicrob Chemother 1998; 4: 6-9.*
17. *Burtin P, Toddio A, Ariburny O, et al. Safety of metronidazole in pregnancy: meta-analysis. Am J Obstet Gynecol 2000; 172; 525-9.*
18. *Cassell G. Ureaplasma infection. In: Hitchcock, P.J. Sexually transmitted disease and adverse outcome of pregnancy. Washingtons, D.C., ASM Press 1999; 75-93.*
19. *Yoshida T, Maeda SI, Deguchi T, Ishiko H. Phylogeny-based rapid identification of mycoplasmas and ureaplasmas from urethritis patients. J Clin Microbiol 2002; 40: 105-10. [Abstract] [Full Text].*
20. *Streer PJ: Preterm labor. In: Edmonds DK (ed.). Dewhurst's Textbook of Obstetrics and Gynecology for Postgraduates, sixth edition. Blackwell Science, 1999; 24: 291-97.*
21. *Ramsey PS, Tamara T, Goldberg, RL. Elevated cervical ferritin levels at 24 weeks gestation are associated with spontaneous preterm birth in asymptomatic pregnant women. J Soc Gynecol Invest 2000; 7: suppl. 190. Abstract.*
22. *Joesoef MR, Hillier SL, Wiknosastro G, et al. Intravaginal clindamycin treatment for bacterial vaginosis: effects on preterm labor and low birth weight. Am J Obstet Gyneco 1995, 173: 1527-31.*
23. *Gravett MG, Nelson HP, De Rouen R, Critchlow C, Eschenbach DA, Holmes KK. Independent association of bacterial vaginosis with adverse pregnancy outcome. JAMA 1986; 256: 1899-1903.*
24. *Causi S, Thorsen P, Schendel DE, Bremmelgaard A, Quadrifogho F, Gauschino S. Determination of IgA against Gardinella 2003.*
25. *Ugwumadu A, Manyonda I, Reid F, et al. Effect of early oral clindamycin on late miscarriage and preterm delivery in asymptomatic women with abnormal vaginal flora and bacterial vaginosis: a randomized controlled trial. Lancet 2003; 361: 983-988.*
26. *Lamont RORF. Role of cytokines in spontaneous preterm labor and preterm birth. Stud J (ed.). In: progress in obstetric and gynecology (16th ed.). Elsevier 2005; 6: 96-98.*