

# The Association of Bacterial Vaginosis with Gynecologic Complaints and Clinical Data

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**OBJECTIVES:** To investigate the relationship between Bacterial vaginosis (BV) and various gynecologic complaints or clinical data.

**STUDY DESIGN:** Cervico-vaginal smears from 200 patients were examined by both cytologic and microbiologic methods in view of BV. Gynecologic complaints were also completed for each woman and these data were recorded on the computer for statistical analysis.

**RESULTS:** Thirteen cases (6.5%) were diagnosed as BV both by cytological and microbiological techniques. These cases were accepted as a study group. Cases without infectious agents (n=187) were the control group. There was a significant correlation between the presence of BV and some parameters such as fishy odor vaginal discharge and abortion(  $p<0.05$ ), but there was no significant difference between BV and other complaints, such as irregular menstrual cycle, abnormal vaginal bleeding, hormone replacement therapy, myoma, operation or usage of IUD ( $p>0.05$ ).

**CONCLUSION:** The type and odor of vaginal discharge and abortion play important role for correct detection of BV cytologically and microbiologically. Awareness of these findings warn not only the gynecologist examining the patients but also the cytopathologist.

**Key Words:** Bacterial vaginosis, Cervicovaginal smears, Vaginal discharge, Abortion, Intrauterine devices

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## Introduction

Bacterial vaginosis (BV) is a common cause of vaginitis. BV is a polymicrobial syndrome in which the normal vaginal lactobacilli, particularly those producing hydrogen peroxide, are replaced by a variety of anaerobic bacteria and mycoplasmas. The most common agents of BV include Gardnerella vaginalis, Mobiluncus, Bacteroides spp. and Mycoplasma hominis<sup>1-7</sup>.

The etiologic agents, which play roles of BV pathogenesis, secrete some metabolites and cause biochemical modifications in vaginal flora. These bacterias change to aminoacids and

other some materials into amines with their decarboxylase enzymes. Because of these amines, vaginal pH increases and fish odor type vaginal discharge which is typical for BV is appeared.<sup>2,4,5</sup>

Cytologically positive women in view of BV mostly are asymptomatic. Although a malodorous vaginal discharge described as "fishy" suggests the presence of BV, only this criterion can not be reliable and is not enough for diagnosis.<sup>7,8</sup> Some women with BV may also report various gynecologic complaints such as abnormal discharge, irregular menstruation or abnormal bleeding, but these symptoms are not compatible criteria for the presence of BV. The single symptom has not enough to diagnose the BV. The application of both cytologic and microbiologic methods are the best way for diagnosis of BV, although signs and symptoms can assist in the diagnosis.

In literature there has been a few studies indicating the association of BV and gynecologic complaints or clinical data. The aim of this study are 1) to investigate BV in view of gynecologic complaints especially malodorous and white color vaginal discharge, 2) to detect the relationship between BV and clinical findings, 3) to discuss these findings whether assist for accurate diagnosis BV.

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## Material and Method

A total of 200 women aged 21-78 years were seen at Gynecology and Obstetrics Clinics of Hacettepe University Ankara, Turkey. Before the pelvic examination, gynecologic complaints and clinical data of the patients were obtained and recorded on a computer.

### Cytological examination

Cervico-vaginal smears were taken from each patient using a cytobrush and fixed in 96% ethanol without air-drying. After fixation, they were stained by the Papanicolaou stain technique and examined with light microscopy (x10 and x40 magnification). To establish diagnosis of BV(+) cases, Pap smears were screened by using cytologic criteria. These are 1) presence of clue cells, 2) absence of vaginal Lactobacilli, 3) absence of polymorphonuclear neutrophilic leukocytes (PMNLs) and 4) profuse free cocci scattered among cornified type epithelial cells giving a nebulous appearance (Figure 1). Vaginal pH was also measured directly using pH paper.

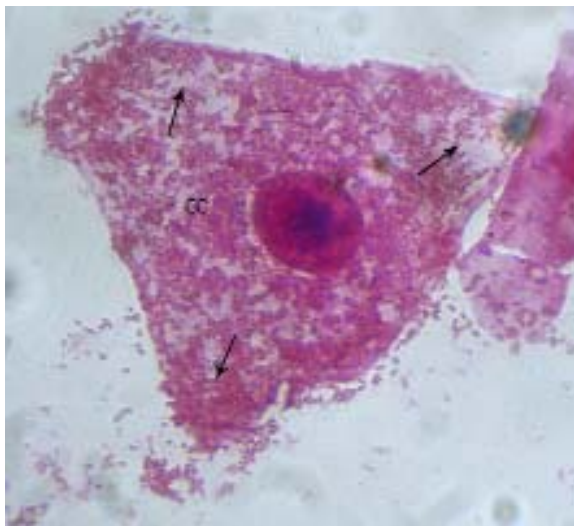


Figure 1 : Clue cell (CC). The surface of this epithelial cell was occupied by coccobacil type microorganisms (arrows) .(Gram x1000)

### Microbiologic examination

For microbiologic examination, the vaginal samples were obtained with a sterile swab and it was transferred into Stuart transport media. Then, specimens were transported to the microbiology laboratory and were cultured on 5% blood agar and Columbia agar. The plates were evaluated following 48 h incubation at 37°C in microaerophilic conditions. Positive cultures for *G. vaginalis* were defined as BV positive.

After inoculation of blood agar and Columbia agar, the swab was smeared directly on glass slides and air dried for a Standard Gram stain. Each slide was examined under an oil immersion objective (x100 magnification). Gram-stained slides were evaluated according to the same cytologic criteria (Figure 2).

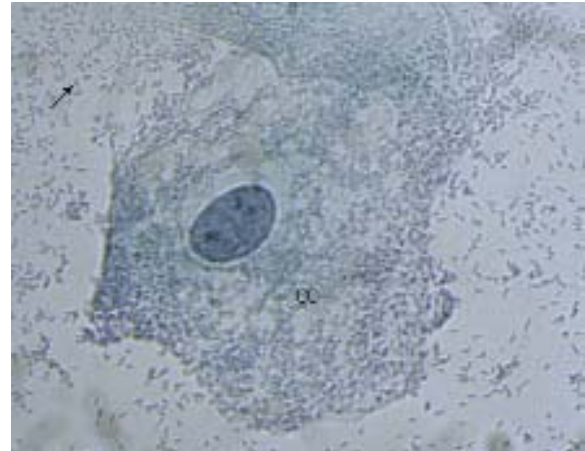


Figure 2 : Profuse free cocci (arrow) around the clue cell (CC). (Papanicolaou stain x 1000)

### Statistical Analysis

The results of the cytologic and microbiologic examination were considered and BV (+) patients were determined. The connection of BV with gynecologic complaints and clinical findings were analyzed and compared statistically with the chi-square and Fisher's exact test using the SPSS program, version 11.5 (Chicago, Illinois, U.S.A.). The limit for statistical significance was  $p = 0.05$ .

## Results

Twenty one of the 200 patients (10.5 %) were detected as BV(+) cytologically and 16 of 200 (8%) were carried out as BV(+) microbiologically. Thirteen cases (6.5%) were also BV(+) both cytological and microbiological techniques. These cases were accepted as a study group. One hundred eighty seven of the 200 had no infection agents were taken as a control group.

In this study, gynecologic complaints and clinical data of the study and control groups were evaluated statistically. Gynecologic complaints and statistical evaluation of the study and control groups were given in Table 1. According to the statistical data, there was a significant difference between the presence of BV and vaginal discharge ( $p < 0.05$ ), but there was no significant difference between the presence of BV and other gynecologic complaints, such as irregular menstrual cycle and abnormal vaginal bleeding ( $p > 0.05$ ). The patients who have vaginal discharge were also evaluated in view of the odor and colour of vaginal discharge. This evaluation was seen in Table 2. According to Table 2, the highest percentage of these data was fishy odor and white colour vaginal discharge (57,1%). Fishy odor and yellow colour vaginal discharge was not seen in 7 patients. However, yellow colour but has not fishy odor was seen only one patient's smear.

All patients' vaginal pH were also measured in this

study. The pH value was detected as higher than 5 in 11 of 13 BV(+) cases (84.61%). There was a visible difference between the presence of BV and the pH higher than 5 ( $p < 0.05$ ).

When the study and control groups were evaluated according to other parameters such as abortion, hormone replacement therapy, myoma, operation and usage of IUD, there was only a statistically significant difference between the presence of BV and abortion ( $p < 0.05$ ). The evaluation of study and control groups according to these parameters were given in Table 3.

The mean age was  $39 \pm 1.59$  for study group, and  $43 \pm 0.85$  years for the control group. There was not a statistically significant difference between the means age of the study and control groups ( $p > 0.05$ ).

## Discussion

Bacterial vaginosis is the most common type of vaginal infection among women. Cytologic and microbiologic methods are used for diagnosis of BV but gynecologic complaints support these methods for an accurate diagnosis. Previous studies revealed that 50% of BV(+) patients are asymptomatic. The most significant gynecological complaint in symptomatic patients was vaginal discharge 5,8,9,10. Like other authors, vaginal discharge was the most common symptom in 7 of 13 BV(+) patients (53,85%) in our study group. While patients with vaginal discharge were examined in detail, white and fishy odor vaginal discharge was seen more frequently than brown and yellow colour vaginal discharge (57.1%). It might be suggested that white colour and fishy odor vaginal discharge is typical gynecologic complaint for BV(+) patients.

Table 1: Gynecologic complaints detected in study and control groups

Gynecologic Complaints	Study Group (n = 13)	Control Group (n = 187)	p Value
Vaginal discharge	7 (53.85 %)	36 (19.25 %)	< 0.05
Irregular menstrual cycle	2 (15.38 %)	18 (9.62 %)	> 0.05
Abnormal vaginal bleeding	1 (7.70 %)	8 (4.27 %)	> 0.05
No complaints	3 (23.07 %)	125 (66.86%)	
Total	13 ( 100.00 %)	187 (100.00%)	

Table 2: The correlation between odor and colour of vaginal discharge in 7 patients who have vaginal discharge

Fishy odor	The type of colour and odor of vaginal discharge (n=7)			Total
	White	Yellow	Brown	
Present	4 (57.1%)	0 (0%)	1 (14.3%)	5 (71.4%)
Absent	1 (14.3%)	1 (14.3%)	0 (0%)	2 (28.6%)
Total	5 (71.4%)	1 (14.3%)	1 (14.3%)	7 (100%)

Table 3: Clinical data detected in study and control groups

Clinical Data	Study Group (n = 13)	Control Group (n = 187)	p Value
	Abortion	4 (30.76 %)	
Hormone replacement therapy	0 (0 %)	20 (10.70 %)	> 0.05
Myoma	3 ( 23.08 %)	21 ( 11.25 %)	> 0.05
Operation	1 ( 7.70 %)	16 ( 8.65 %)	> 0.05
Usage of IUD	1 ( 7.70 %)	9 ( 4.76 %)	> 0.05
Others	4 (30.76 %)	109 (58.27%)	
Total	13 (100.00%)	187 (100.00%)	

BV also causes some important complications such as spontaneous abortion, preterm labor, premature rupture of membranes and amniotic fluid infections during pregnancy.<sup>13-17</sup> The reason of these complications are phospholipases, proteases and some cytokines secreted by BV-related microorganisms. Phospholipases and proteases catalyze the release of arachidonic acid and this acid is a precursor for prostaglandins. In addition to this, inflammatory cytokines (interleukin-1, interleukin-6 and tumor necrosis factor) in amniotic fluid of women also stimulate the production of prostaglandin. Due to the myometrial spasm or secreting of the oxytocin caused by prostaglandins directly start the abortion and other complications related pregnancy.<sup>13</sup> In our study, the prevalence rate of abortion is higher in BV(+) cases (30.76%) than in BV(-) cases (6.42%). There is also significant correlation between positivity of BV and abortion. We can postulated that these enzymes and cytokines might be caused abortion in BV(+) cases. It can be investigated the effect of these chemical substances by using some biochemical tests in other study.

There are some studies showing the relationship between BV and contraception methods. Castro et al. investigated the possible association of BV with the use of different types of contraceptives (oral contraceptives, intrauterine devices =IUD,condom). In this investigation, both oral contraceptive and condom use showed a significant protective effect against bacterial vaginosis. The study also showed a significant increase of BV in IUD users. According to literature, the use of oral contraceptives increases the glycogen content of vaginal epithelial cells. Lactobacilli produce lactic acid by using this glycogen and can inhibit the BV-related microorganisms. Studies also suggest that the tail of IUD present in the vagina may favor the growth of vaginal anaerobic bacteria and Gardnerella vaginalis, so these microorganism very likely play a role in BV infection. In our study, only 1 of 13 BV(+) patients (7.70%) used copper-T IUD for more than 5 years. Copper ions protect the cervico-vaginal microflora against microorganisms due to the antibacterial and antifungal action of copper salts. The effect of copper is decreased by releasing copper salts from device after one year and because of this decreasing the protective effect of IUD may be reduced in prolonged usage of IUD. The number of IUD users in our study group is not enough for correct statistical analyses. But based on the literature and our patient using IUD for more than 5 years, we could suggest that long-term usage of copper-T IUD might be predisposed the vaginal flora for BV infection.<sup>11,12,13,18,19</sup>

In our study there were also detected some other clinical data such as hormone replacement therapy, myoma and operation (Table 2). There was no significant difference between these clinical data and BV ( $p>0.05$ ). We thought these pa-

rameters have not been fully evaluated statistically because of the less number of patients. More comprehensive studies can be planned to give definitive results.

According to the literature, vaginal pH is greater than 5 is an other diagnosis criteria of BV(+) patients. The dominant elements of the normal vaginal flora lactobacilli produce microbial toxins such as lactic acid and hydrogen peroxide to make the acidic vaginal pH. The cause of rising vaginal pH is due to hormonal changes and use of antibiotics, decreasing of vaginal lactobacilli and increasing of anaerobic and facultative bacteria 3,7,8. Similarly to the literature, pH was greater than 5 in 11 of 13 BV(+) patients (84,61%) in our study group.

In conclusion, we observed BV(+) cases by using cytologic and microbiologic methods. We also analyzed the gynecologic complaints and clinical data to determine the correct diagnosis of BV. The most important gynecologic complaint and clinical data obtained to the study are white, fishy odor vaginal discharge and abortion. These clinical parameters are important to support BV diagnosis.

## Bakteriyel Vajinoz ile Jinekolojik Şikayetler ve Klinik Bilgiler Arasındaki İlişki

**AMAÇ:** Bu çalışmanın amacı, bakteriyel vajinoz (BV) ile çeşitli jinekolojik şikayetler ve klinik bilgiler arasındaki ilişkinin araştırılmasıdır.

**GEREÇ VE YÖNTEM:** İki yüz hastadan alınan servikovajinal örnek, BV varlığı açısından sitolojik ve mikrobiyolojik yöntemler kullanılarak incelenmiştir. Ayrıca her hastaya ait jinekolojik şikayetler bilgisayara kaydedilip istatistiksel olarak değerlendirilmiştir.

**BULGULAR:** On üç hastaya (%6,5) hem sitolojik hem de mikrobiyolojik olarak BV tanısı verilmiştir. Bu hastalar çalışma grubu, enfeksiyon tespit edilmeyen 187 hasta ise kontrol grubu olarak kabul edilmiştir. BV varlığı ile balık kokulu vajinal akıntı ve düşük arasında istatistiksel açıdan anlamlı bir ilişki saptanırken ( $p<0,05$ ); BV varlığı ile adet düzensizliği, anormal kanama, hormone tedavisi, miyom varlığı, operasyon ve rahim içi araç kullanımı gibi şikayetler arasında istatistiksel açıdan anlamlı bir ilişki bulunamamıştır ( $p>0,05$ ).

**SONUÇ:** BV'nin sitolojik ve mikrobiyolojik olarak tanısında akıntının tipi ve kokusu ile düşük hikayesi önemli role sahiptir. Bu bulguların varlığı hastanın değerlendirilmesi açısından yalnızca jinekoloğa değil aynı zamanda sitopatoloğa da uyarıcı nitelik taşımaktadır.

**Anahtar Kelimeler:** Bakteriyel vajinoz, Servikovajinal yayma, Vajinal akıntı, Düşük, Rahim içi araç

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