

## BACTERIAL VAGINOSIS

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### Abstract

**Introduction:** The vagina is normally inhabited by a number of organism, including *Lactobacillus acidophilus*, diptheroids, *Candida* and others. Normal vaginal flora contains aerobic and anaerobic bacteria, such as *Lactobacillus* species being the prominent microorganism with number more than 95% of the total bacteria present. Vaginal discharge can be classified into physiologic and pathologic discharge. **Discussion:** Bacterial vaginosis is a clinical syndrome caused by the alteration of *Lactobacillus* Sp that producing hydrogen peroxide with anaerobic bacteria that caused the disruption of the normal flora balance. Risk factors of bacterial vaginosis are sexual activity, vaginal douching, genetic, vaginal manipulation, smoking and using the intrauterine device. Diagnosis of bacterial vaginosis can be enforced by the gram staining and the calculation of Nugent score (positive diagnosis of bacterial vaginosis if nojent score 7-10). Amsel score can also be conducted if the Nugent score examination cannot be performed. Amsel score criteria consists of white homogen vaginal discharge, fishy odor (positive Whift test), pH > 4.5, and the finding of clue cell. The discovery of 3 criteria of Amsel can confirm the diagnosis of bacterial vaginosis. Treatment of bacterial vaginosis including systemic and topical therapy. Systemic antibiotic such as metronidazole and clindamycin is effective against the anaerob bacteria. **Conclusion:** bacterial vaginosis in an abnormal condition in the vagina caused by the overgrowth of anaerobic bacteria replacing the *Lactobacillus hominis* that caused the change of normal acidic pH vagina into alkaline. Amsel criteria and Nugent score can be requested to confirm the diagnosis of bacterial vaginosis. Proper diagnosis and treatment with metronidazole and clindamycin can improve the disease.

**Keywords:** bacterial vaginosis, clue cells, whift test

### Introduction

The vagina is normally inhabited by a number of organism, including *Lactobacillus acidophilus*, diptheroids, *Candida* and others. Normal vaginal flora contains aerobic and anaerobic bacteria, such as *Lactobacillus* species being the prominent microorganism with number more than 95% of the total bacteria present. Physiologic pH of vagina is around 4.0 which can inhibits pathogenic bacteria for overgrowing. <sup>1,2</sup> Bacterial vaginosis in a clinical syndroms that caused the alteration of *Lactobacillus* sp with anaerobic bacteria such as *bacteroides* Sp, *Mobiluncus* Sp, *Gardnerella vaginalis*, and *Mycoplasma hominis*.<sup>3</sup> About 84% of women with bacterial vaginosis infection reported no symptoms. Women with no history of vaginal, oral, and anal sex can still be infected with bacterial vaginosis (18.8%), as well as pregnant women (25%).<sup>4,5</sup>

Diagnosis of bacterial vaginosis can be confirmed by Amsell criteria and gram staining examination of Nugent score. Amsell criteria include white homogen vaginal discharge, pH more than 4.5, postive whift test (fishy odor) and the finding of clue cell. The finding of 3 criteria of Amsell can confirm the diagnosis. The finding of Nugent score 7-10 also can support

the diagnosis of bacterial vaginosis.<sup>6</sup> bacterial vaginosis is commonly asymptomatic, and about 1 in 4 women with bacterial vaginosis will recover without any treatment, because the Lactobacillus organisms return to normal levels, and followed by the decreasing of other bacteria. But some others women, the delayed in treatment of bacterial vaginosis can cause more severe condition.<sup>3</sup> broad spectrum antibacterial against most anaerobic bacteria, usually effective against bacterial vaginosis. The drug of choice of bacterial vaginosis are metronidazole and clindamycin and consider safe to be administered to the pregnant women.

## Discussion

### *Definition*

Bacterial vaginosis is a clinical syndrome caused by the alteration of Lactobacillus Sp that producing hydrogen peroxide with anaerobic bacteria that caused the disruption of the normal flora balance.<sup>6,7</sup>

### *Epidemiologic*

The prevalence of bacterial vaginosis is difficult to be determined because 25% to 30% are asymptomatic. Women with sexually active have a higher incidence of bacterial vaginosis, it is reported 15% of women who visited the gynecologic clinics and 33%-37% who visited the sexually transmitted disease infection clinics.<sup>4,5</sup>

### *Etiology*

The bacterial vaginosis caused by the alteration of normal vagina flora because the predominance of anaerobic bacteria with caused the change in normal pH of the vagina. Risk factors for bacterial vaginosis are:<sup>6,8-10</sup>

- a. Sexual activity  
Sexual intercourse can cause the shift of bacteria in vagina. The exposure of the sperm into vagina can increase pH levels because sperm has an alkaline pH (about 7.2)
- b. Vaginal manipulation  
Washing vaginal using soap, using tampons, and phytopharmaceuticals can increase the pH so that caused the overgrowth of anaerobic bacteria.
- c. Genetic  
African-American have a higher numbers of anaerobic bacteria such as Anaerococcus, Peptoniphilus, Coriobacteriaceae, Parvimonas, Megaspheera, Sneathia, and Prevotella as resident of vaginal flora. This caused the African-American population more susceptible to be infected by bacterial vaginosis. In contrast to the European and Hispanic where Mycoplasma hominis and Corynebacterium were mostly found.
- d. Vaginal douching  
Douching can change the ecology of vagina so that increase the risk of bacterial vaginosis.
- e. Smoking  
Cigarette contain nicotine, cotinine and benzopyrenedioloxide, which present in the cervical mucus fluid of smokers and can directly change the vaginal microflora or destroy the Langerhan cells in the cervical epithelium causing local immunosuppression.
- f. Intrauterine devices  
Avonts reported that bacterial vaginosis was increased among intrauterine device users compared to oral contraceptives. It can be caused by the IUD in the endocervix or vagina creates an environment for the growth of anaerobic bacteria and G. vaginalis.

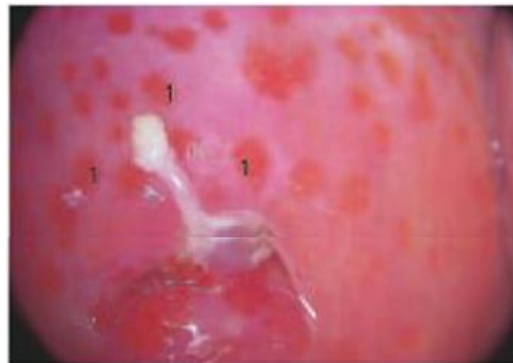
*Pathogenesis*<sup>3,7,10</sup>

In bacterial vaginosis, there can be a symbiosis between *G vaginalis* as an amino acids, anaerobic bacteria and facultative bacteria in the vagina convert amino acids into amines thereby increasing the pH of the vaginal secretion to a suitable environment for the growth of *G. vaginalis*. Some amines cause irritation of the skin and increase the shedding of epithelial cells and produce unpleasant body odor. Anaerobic bacteria that are associated with bacterial vaginosis including *Bacteroides bivius*, *B. Capilosus* and *B. disiens*.<sup>1</sup> Lactobacilli that were colonized in normal vagina were able to produce  $H_2O_2$ , but in patients with bacterial vaginosis because there was a decrease in the total lactobacilli population, so the remaining population was unable to produce  $H_2O_2$ . It is known that  $H_2O_2$  can inhibit the growth of germs involved in vaginosis.<sup>6,7,10</sup>

Amines in high vaginal pH will easily evaporate that can cause a fishy odor, that can be induced also if the vaginal secretion of bacterial vaginosis patients are dripped with 10% KOH. The aromatic amine that is associated with the fishy odor including trimethylamine, an abnormal amine that is dominant in bacterial vaginosis. There are other amine compounds, known as putresin and cadaverine. In alkaline pH, *G vaginalis* adheres tightly to the loose vaginal epithelial cells and forms clue cells.<sup>6,9,11</sup>

### Differential diagnosis

Differential diagnosis of bacterial vaginosis are trichomoniasis and vulvovaginal candidiasis. Trichomoniasis has characteristic vaginal discharge as yellow-green in color, itching, swelling and erythema of the vulva, dyspareunia, lower abdominal discomfort or dysuria. On physical examination, bleeding spots can be seen on the walls of the vagina and cervix, term is "colpitis macularis" or "strawberry cervix".<sup>6</sup>



Picture 1. "strawberry cervix" figures in trichomoniasis

Meanwhile, in vulvovaginal candidiasis the chief complaint is itching in the area of vulva. In severe case, there is also a report of burning sensation, dyspareunia and pain after micturition. Physical examination shows hyperemia on vulva. Flour albus in candidiasis is yellowish in color. A distinctive sign is accompanied by lumps as a yellowish white milk head.<sup>9,11</sup>



Figura 1 Vulvovaginitis cándida



Figura 2 Vulvovaginitis cándida y verrugas

Picture 2. Vaginal discharge in vulvovaginal candidiasis

### *Diagnosis*<sup>10,12</sup>

The characteristic of bacterial vaginosis is the finding of white homogen discharge, adheres to the vaginal wall. mostly patients of bacterial vaginosis is asymptomatic. The Amsell criteria and Nugent criteria can confirm diagnosis of bacterial vaginosis. Amsell criteria consist is the increase of vaginal discharge that is homogenous, the pH of vaginal discharge more than 4.5, positive whiff test and the finding of clue cells on microscopic examination. The patients of bacterial vaginosis usually complaint with excessive vaginal discharge, white homogenous discharge with fishy odor and more abundant after sexual intercourse. On speculum examination, te vaginal fluid was watery, homogenous, and adhered to the vaginal wall but was easy to clean.<sup>6</sup> Vaginal pH was determined by examining vaginal secretions taken from the lateral vaginal wall using cotton swab and smeared on the ph strip paper.<sup>2,4,6</sup> the Whift test was tested by dripping 10% KOH on vaginal secretions, and declared positive if after spraying there was a fishy odor. It is because of an increaze in vaginal pH causes amino acids to break down easily and release putescine and cadaverine which have fishy smell characteristic. In speculum examination, it is added when we put 10% KOH in the vaginal fluid cause a fishy smell. Clue cell are vaginal epithelial cells surrounded by gram coccobacilli bacteria so that the border becomes unclear or mottled. It found at least 20% of the field of light microscope.

The Spiegel examination method is an assesment based on the. Number of Lactobacillus, Gardnerella and mixed flora bacteria in establishing a diagnosis of whether a person is diagnosed with bacterial vaginosis or not. The Spiegel criteria only has two criteria, known as normal and positive bacterial vaginosis, make it easier to determine to continue the treatment. Nugent score is a method of diagnosing bacterial vaginosis infection with an approach based on the number of bacteria present in vaginal secretions. Nugent criteria is a modification of the Spiegel method in calculating the number of germs in wet preparations of vaginal secretions. If there are five or more bacteria are given score of 2, less than 5 are given a score 1, and in the absence of bacteria a score of 0 is given. The criteria for bacterial vaginosis infection is a score of 7 or higher, a score of 4-6 is considered intermediate, and a score of 0-3 is considered normal. Cultur is the gold standard for the diagnosis of most diseases caused by bacterial infection. However, in bacterial vaginosis culture is not a gold standard, because the organisms involved in bacterial vaginosis infection cannot be separated easily and the the bacteria that play a role in bacterial vaginosis infection are still present in small number under normal condition.<sup>6</sup>

### *Treatment*<sup>1,2,6,7</sup>

All symptomatic bacterial vaginosis require treatment, including pregnant women. Metronidazole and clyndamycin is commonly uses to treat bacterial vaginosis.<sup>1,2,6,7</sup> metronidazole is the most frequently used which a report of healing process of more than 90%, with a dose of 400 mg given twice daily or 500 mg giventwice daily for 7 days. If this treatment fails, then oral ampicillin (or amoxicillin) ias given as a second drug choice with a cure success rate of about 66%. Metronidazole has moderate activity against G. vaginalis, but is very active against anaerobic bacteria, and its effectiveness is related anaerobic inhibition. Metronidazole can cause nausea and dark urine. Clyndamycin 300 mg, twice daily for 7 day is as effective as metronidazirole for the treatment of bacterial vaginosis with a cure rate of 94%. Clyndamycin is consider safe to give to pregnant women. Small amounts of clyndamycin can penetrate breast milk, so it is advisable to use intravaginal treatment for breastfeeding women. 500 mg amoxicillin and 125 mg clavulanic acid thrice daily for 7 days has a moderate effectivity for pregnant woemen ad intolerance to metronidazole. Others drugs that is proofed effective in treatment of bacterial vaginosis are etracycline 250 mg, four times daily for 5 days, doxycycline 100 mg twice a day for 5 days, erythromycin 500 mg, 4 times a day for 7 days, and cephalixin 500 mg, 4 times a day for 7 days.

Topical treatment which is usually used as the therapy of bacterial vaginosis are metronidazole intravaginal gel (0.75%) once a day for 5 days, clyndamycin crem (2%) once a day for 7 days, intravaginal tetracycline 100 mg, once a day.

### *Complication*<sup>6</sup>

Bacterial vaginosis has been indicated as the risk factor for preterm labor and preterm delivery in pregnancy. Bacterial vaginosis is also associated as a risk factor for transmitting and developing HIV. Several studies have linked bacterial vaginosis to postpartum fever, postpartum endometritis, postoperative gynecologic complication and postlabortion infections, but the further investigation is still needed to determine the possible sequelae.

### *Prognosis*<sup>8</sup>

The prognosis of bacterial vaginosis is good, spontaneous improvement reported in a third of the cases and with metronidazole and clyndamycin gives a high cure rate (84-96%).

### **Conclusions**

Bacterial vaginosis in an abnormal condition in the vagina caused by the overgrowth of anaerobic bacteria replacing the *Lactobacillus hominis* that caused the change of normal acidic pH vagina into alkaline. Amsel criteria and Nugent score can be requested to confirm the diagnosis of bacterial vaginosis. Proper diagnosis and treatment with metronidazole and clindamycin can improve the disease.

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