In 1955, a cause of nonspecific vaginitis (bacterial vaginosis) was described by two scientists: Gardner and Dukes. The bug was named Haemophilus vaginalis, later the name was changed to Corynebacterium vaginale, and finally, the bacterium responsible for the condition obtained the name Gardnerella vaginalis (1980) after the scientist who discovered it. Gardnerella vaginosisis a non-specific infection of the vaginal tract caused by gram negative bacteria named as Gardnerella vaginalis. This condition is not regarded as sexually transmitted disease, but sexual activity enhances the development of the infection.

Definition and Background of Gardnerella Vaginalis

Gardnerella vaginalis is a pleomorphic, gram-variable (mostly gram-negative), facultative nonmotile anaerobic rod, which is the most frequent participant in all vaginitis in women (90% of vulvovaginitis) and causes epidemiological concern in males (urethritis).

Owing to the advanced technologies applied in microbiology, namely, the invention of the
electron microscope, and improved laboratory equipment, as well as testing methods (isolation and identification of bacteria), the term “nonspecific vaginitis” lost its meaning as the causing reason of the condition was detected and described in detail.

The main way of transmission of the G. vaginalis is through sexual infection. Some clinical researchers suggest that the rectum may be inhabited with G. vaginalis, hence the bug can travel to genitals from the rectum as well, and thus, self-infection may result relatively.

The healthy female vagina contains high concentration of lactobacilli that are responsible for acidic pH of vagina. Gardnerella infection reduce lactobacilli population thereby increasing the vaginal pH.

Advanced stages of the infection may lead to severe consequences in the form of the pelvic inflammatory disease.

Etiology of Gardnerella Vaginalis

- Bacterial vaginitis (BV, vulvovaginitis) develops due to the infection with different anaerobic bacteria, including B. vaginalis, and is a result of their interaction: Lactobacillus, Prevotella; anaerobes: Mobiluncus, Bacteroides, Peptostreptococcus, Fusobacterium, Veillonella, and Eubacterium, Mycoplasma hominis, Ureaplasma urealyticum, Streptococcus viridans and Atopobium vaginae
- Impaired immune response may become a triggering factor for the development of BV.
- Less estrogen production of the host
- High frequency of intercourse
- Multiple sex partners
- Use of IUD
- Pregnancy
- Long-term antibiotic therapy
- Douching
- Promiscuity in sexual contacts

Epidemiology of Gardnerella Vaginalis

BV is a very common condition. In the US, 29.8% of the female population was diagnosed with BV with Gram stain in vaginal fluid. Susceptibility increases amidst those ones who are non-white, practice douching, have numerous sexual partners, and have sex with women and smoke and are obese. It occur mainly in women of reproductive age. HIV sufferers twice as often get infected with G. vaginalis and develop BV.

Internationally

G. vaginalis is very common worldwide, especially in the countries with a humid and hot climate, thus sub-Saharan Africa accounted for over 50% of women infected with G. vaginalis, meanwhile they had a risk of contracting HIV as well.

Presentation of Gardnerella Vaginalis
History

- **Foul vaginal odor** ("fishy odor") especially after sexual intercourse (one of the most distinguishing features of BV).
- Increased amount of **Grayish vaginal discharge** which is non-painful and non-inflammatory.
- **Grayish vaginal discharges.**
- **Dysuria.**
- **Vulvar irritation** (itchiness).

Physical examination

The labia, introitus, cervix, and cervical discharge are of normal appearance; however, there may be signs of **cervicitis**. Vaginal walls produce enhanced light reflex without pronounced inflammation. Vaginal mucosa is covered with gray, liquidly homogenous discharges.

Differential Diagnosis of Gardnerella Vaginalis

**Candidiasis**

This is a **vaginal yeast infection** caused by **Candida albicans** (redness and itchiness of vagina; curd-like discharges; cervix: normal findings in speculum examination).

**Cervicitis**

This describes the condition when there are visible purulent or mucopurulent endocervical discharges in the cervical canal, and the cervix easily bleeds on a touch.

**Chlamydial genitourinary infections**

These are caused by the bacterium called **Chlamydia** and is the leading course of **infertility** in women in the US. Chlamydia affects the urethra, salpinges, uterus, nasopharynx, and epididymis, causing unpleasant vaginal discharges, vaginal bleeding between periods, lower abdominal pain, sometimes fever if pelvic organs are involved in inflammation, dyspareunia and rectal discharges after anal intercourse.

**Gonorrhea**

The so-called “clap” is caused by the bacterium **Neisseria gonorrhoeae** and presents with thin or thick, purulent, and mildly odorous vaginal discharges, sometimes minimal or no discharges, dyspareunia, mild lower abdominal pain and bleeding between periods.

**Herpes simplex**

Herpes simplex is caused by the virus of herpes family and the signs are ulceration of the penis or vagina followed with insignificant discharges, itchiness of affected zones and there might be enlarged local lymphatic nodes, as well as fever and malaise.
Trichomoniasis

This condition causes gray, yellow, or green foul discharges from the vagina urethra, painful urination, and intercourse, dysuria, vaginal bleeding after intercourse or unrelated to menses, genital itchiness, and a burning sensation.

Table: Differential Diagnosis of Vaginitis

<table>
<thead>
<tr>
<th>Clinical Elements</th>
<th>Bacterial vaginosis</th>
<th>Trichomoniasis</th>
<th>Vaginal candidiasis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms</td>
<td>Vaginal odor</td>
<td>+</td>
<td>+/-</td>
</tr>
<tr>
<td>Vaginal discharge</td>
<td>Thin, gray, homogenous</td>
<td>Green-yellow</td>
<td>White, curd-like</td>
</tr>
<tr>
<td>Vulvar irritation</td>
<td>+/-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Dyspareunia</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Signs</td>
<td>Vulvar erythema</td>
<td>-</td>
<td>+/-</td>
</tr>
<tr>
<td>Bubbles in vaginal fluid</td>
<td>+</td>
<td>+/-</td>
<td>-</td>
</tr>
<tr>
<td>Strawberry cervix</td>
<td>-</td>
<td>+/-</td>
<td>-</td>
</tr>
<tr>
<td>Microscopy</td>
<td>Saline wet mount</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clue cells</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Motile protozoa</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Pseudohyphae</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Whiff test</td>
<td>+</td>
<td>+/-</td>
<td>-</td>
</tr>
<tr>
<td>pH</td>
<td>&gt;4.5</td>
<td>&gt;4.5</td>
<td>&lt; 4.5</td>
</tr>
</tbody>
</table>

Diagnosis of Gardnerella Vaginalis

Laboratory studies

**Microscopic examination** of the vaginal discharges (*clue cells* - vaginal epithelial cells with attached bacteria on their surfaces, edges of the cells are stubbed, and “peppered” with coccobacilli; PH is greater than 4.5; color is grey, liquidly and homogenous; there is little amount of polymorphonuclear leukocytes (PMNs)-1 per one vaginal epithelial cell). Catalase-negative, oxidase-negative and facultative anaerobe.

**The whiff test** is positive in 90% of cases (mixing of vaginal fluid with a drop of KOH on a microscope slide detects the presence of amine which is produced by anaerobic bacterial metabolism).

**Microscopic evaluation** of the bacteria flora is informative while looking for evidence of changes in the overall bacterial predominance, thus normally lactobacilli (large gram-positive rods) is predominant, in BV coccobacilli dominant over any other microflora (anaerobes) with reduction in population of lactobacilli.

**Vaginal cultures** are used in order to exclude other pathogenic growth apart from *G. vaginalis*, namely: *Trichomonas* species, *C. trachomatis*, *N. gonorrhea*. *G. vaginalis* detected in 100% of BV, and in 70% of asymptomatic BV.

Procedures

**Colposcopy** reflects clean, translucent mucus in external cervical os and opaque vaginal contents in the rear vaginal vault. “Spotted” images visible after **Schiller test** are pathognomonic colposcopic features of *Gardnerella vaginalis* infection.

Treatment of Gardnerella Vaginalis

The treatment of Gardnerella vaginalis have to be prescribed appropriate based on the
results of clinical examination and cytological test. For the pharmacotherapy of Gardnerella vaginalis, doctors recommend metronidazole, metronidazole gel or clindamycin cream. **Antibacterial therapy** has to be taken into account in the first order while pharmacological treatment.

### Pharmacotherapy

<table>
<thead>
<tr>
<th>Medication</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metronidazole 500 mg, orally twice per day</td>
<td>7 days</td>
</tr>
<tr>
<td>Metronidazole gel 0,75%, one full applicator intravaginally (5g), once a day</td>
<td>5 days</td>
</tr>
<tr>
<td>Clindamycin cream 2% one full applicator intravaginally (5g) at bedtime</td>
<td>5 days</td>
</tr>
</tbody>
</table>

Patients taking treatment with **metronidazole** have to refrain from alcohol during the entire course and 24 hours afterward; **clindamycin cream** softens the latex of condoms and diaphragms for 5 days after use.

According to severity and nature of illness, restriction of sexual activity may be recommended.

**Surgical intervention** is not required in G. vaginalis infection.

### Patients frequently ask

#### Is gardnerella vaginalis in men possible?

Gardnerella vaginalis is rare in men and has probable risk factors only in immunosuppressant males or in those who have anatomical genitourinary abnormalities or who are alcoholic. It is not considered to be a sexually transmitted infection but might be passed during intercourse. If Gardnerella is diagnosed, men should also take standardized treatment as precaution to avoid retransmission to the partner.

#### Is gardnerella a sexually transmitted disease?

Gardnerella vaginalis is not considered as a sexually transmitted disease, but sexual contact may induce development of this condition in some patients. An increased number of sexual partners in a month or having increased number of lifetime sexual partners may predispose the condition.

### References

- [Gardnerella vaginalis infection – another sexually transmitted disease](nih.gov)
- [Gardnerella vaginalis has a gram-positive cell-wall ultrastructure and lacks classical cell-wall lipopolysaccharide](microbiologyresearch.org)
- [Gardnerella vaginalis: characteristics, clinical considerations, and controversies](nih.gov)
- [Medscape.com](medscape.com)
- [Trichomoniasis](webmd.com)
- [Colposcopy images of cervix in women with Gardnerella vaginalis infection](nih.gov)

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