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.

Definition and Background of Gardnerella Vaginalis

G. vaginalis is a gram-negative, facultative nonmotile anaerobic bacterium, 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 electronic 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 researches 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 occurs accordingly.

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

Etiology of Gardnerella Vaginalis

- **Bacterial vaginitis** (BV, vulvovaginitis) develops due to the infection with different bugs 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.
- **Pregnancy.**
- **Long-term antibiotic therapy.**
- **Douching.**
- **Promiscuity** in sexual contacts.

Epidemiology of Gardnerella Vaginalis

BV is very common among women. 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. 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 vaginal discharges.
- **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, dipareunia, 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 mensis, 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>
</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).

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).

**Vaginal cultures** are used in order to exclude other pathogenic growth apart from G. vaginalis, namely: Trichomonas species, C. trachomatis, N. gonorrhoeae. 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 pathognomic colposcopic features of Gardnerella vaginalis infection.

Management of Gardnerella Vaginalis

All patients with BV have to be prescribed appropriate treatment based on the results of clinical examinations and cytological tests. **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>Metronidazol 500 mg, orally twice per day</td>
<td>7 days</td>
</tr>
<tr>
<td>Metronidazol 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 bed time</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 afterwards; **clindamycin cream** softens the latex of condoms and diaphragms for 5 days after use.

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