

Fishy odour caused by Bacterial Vaginosis – aetiology and a brand new treatment

by Inge Dorte Hansen, Microbiologist, LadyBalance ApS

Fishy odour in women can be characterised as a condition, rather than an infection. Therefore the solution can be a continuous adjustment of the physiological root cause of the condition.

Introduction

Bacterial Vaginosis (BV) is a clinical syndrome characterised by malodorous discharge. Bacterial Vaginosis is the most common type of vaginal infection in women of reproductive age, accounting for 45 % of all vulvovaginal infections. Moreover it has been related to a variety of upper genital tract infections and obstetrical complications. These include pelvic inflammatory disease (PID), post-caesarean endometritis, posthysterectomy pelvic infection, chorioamnionitis, premature rupture of membranes (PROM) and preterm labour and delivery. The prevention of these infections for a woman and her child is an important issue in women's health (1).

Epidemiology

Fifteen percent of gynaecological patients and 10 – 30 percent of pregnant women have BV, whilst up to 60 percent of women visiting a clinic for sexually transmitted diseases are estimated to suffer from BV(1).

Bacterial Vaginosis have been associated with non-caucasians, sexual activity and the intra-uterine device, but no precise studies are available. There are indications of sexual transmission of the disease, but other routes are also indicated.

Pathophysiology

The normal vaginal flora is dominated by lactobacilli which account for 95 percent of the bacteria present in the vagina, with other facultative and anaerobic bacteria present in only small numbers. Bacterial Vaginosis represents a complex change in the vaginal ecosystem characterized by a reduction in the prevalence and concentration of lactobacilli and an increase in the prevalence and concentration of *Gardnerella vaginalis*, anaerobic gram-negative rods, and *Mycoplasma hominis*. In BV, a flora consisting primarily of benign lactobacilli is replaced by a flora consisting of high concentrations of potentially virulent bacteria. Lactobacilli maintain the acid pH in the vagina by producing lactic acid which maintains a low pH of normally less than 4.5. Low pH directly inhibits the growth of anaerobic organisms. Hydrogen peroxide-producing lactobacilli also appear to play a role in limiting *Gardnerella* and the anaerobic flora of the vagina (1). Moreover the especially virulent Prevotella and Porphyromonas species are present in particularly high numbers in patients with BV (1).

Clinical manifestations and diagnosis

When affected women are symptomatic they complain predominantly of vaginal odour. The odour is described as fishy. Patients often refer to embarrassing vaginal odour especially after intercourse. About 90 percent of patients also notice mild to moderate discharge. Pain symptoms are rare because the infection is not linked to inflammation of the tissue. Patients with BV may not display the symptoms which would normally alert their physicians to the infection. In fact, nearly half of the patients with BV do not complain of excess or malodorous vaginal discharge.

The diagnosis require three of the following signs to be present:

1. A homogenous, white or grey, noninflammatory discharge that adheres to the vaginal wall.
2. The presence of clue cells (> 20 % of the epithelial cells in 400 x magnification) on microscopic examination of fresh smears.
3. The pH of vaginal secretions greater than or equal to 4.7
4. A fishy odour of vaginal discharge before or after adding of 10 % KOH.

Culture of *Gardnerella vaginalis* is not recommended as a diagnostic tool, as it is not specific. But a promising microscopic method is currently under investigation (5).

Gynaecological complications

A study showed that patients with BV had a 5.1-fold higher risk of post-partum endometritis following Ceasarean section than patients with a lactobacilli-dominant flora.

Patients with BV have a four times higher rate of vaginal-cuff cellulitis following abdominal hysterectomy than patients with a lactobacillus-dominant flora.(1)

The rate of post-abortion pelvic inflammatory disease was three times smaller in patients treated with a BV effective antibiotic compared with placebo-treated patients. Prematurity occurs 1.9 times more often and premature rupture of membranes occur 3.5 times more often in women with BV than in those without BV. BV bacteria are frequently isolated from amniotic fluid and could play a major role in premature delivery (1).

Traditional treatment options

The established medicine offers treatment with either of two antibiotics, clindamycin or metronidazole, either topically or by the oral route.

Metronidazole as a 7 day treatment has a 80 – 90 % cure rate after 1 month. Side effects are nausea, abdominal cramps and a metallic taste. The patient must refrain from intake of alcohol, as it may produce antabuse effects. It is not recommended in the first trimester of pregnancy.

Clindamycine as a 7 day treatment has equal effects as metronidazole, and it has fewer side effects, though diarrhoea is possible. Concerns about *Clostridium difficile* colitis has prevented widespread use.

Topical application through vaginal preparations have minimised side effects; however this approach is more expensive.

Especially for metronidazole, there is an ongoing discussion concerning the possible carcinogenic effect. The compound is prohibited in the EU for veterinary use for this reason. The evidence of human carcinogenicity is being discussed in detail (6).

Reoccurrence

The cure rate is high, but a significant proportion of women suffer relapses and recurrences. There is some evidence that residual biochemical and microbiological abnormalities persist in these women (2).

Different alternative measures have been recommended (live yoghurt bacteria, *Lactobacllus acidophilus* preparations, acetic acid flushes). A number of lactic acid bacteria products are available, e.g. Vivag, EcoVag, Vagiflor – the product names would be specific to the market, but the content is more or less the same. Studies of live yoghurt or *Lactobacllus acidophilus* have not demonstrated benefits (3). When the problem is caused by the lack of lactic acid bacteria, as after an antibiotic treatment, the lactic acid bacteria have beneficial effect. But most users report an effect seldom exceeding the period of treatment.

Rationale for lactose treatment

As the course of bacterial vaginosis is an excessive growth of non-beneficial organisms which are widespread in the environment, the treatment aimed at eradicating these is likely to fail. A method based upon a control of the growth environment to help the lactic acid bacteria multiply and depress the growth of *Gardnerella vaginalis* and others is an approach which is more likely to succeed.

Gardnerella vaginalis is characterised as a protein degrading organism, recognisable by the amine smell. Only a few carbohydrates, including glucose, are fermented. Fermentation of lactose is not recorded. The organism is inhibited at low pH (4). Most lactic acid bacteria grow rather well in acid environments. They ferment many carbohydrates – especially the disaccharide lactose and thereby acidify the environment.

The principle in the lactose method is to supply the vaginal flora with lactose or any other carbohydrate which the lactic acid bacteria are able to ferment to lactic acid, eventually also producing acetic acid, hydrogen peroxide or other antimicrobial substances. The carbohydrate must be non-fermented by BV organisms. Thereby the environment is turned acid and unsuitable for the BV producing organisms and they will be eliminated by competition.

Lactose in an applicable form is not easy to obtain, but it is marketed in the form of dry tablets (www.ladybalance.com).

The lactose method is also not expected to eliminate the BV organisms. But lack of efficient alternatives and the absence of side-effects of this pure nutrient approach makes the likely continuous or repeated treatment acceptable.

Required research

The reason for women developing BV is most likely related to the secretion of nutrients through the vaginal mucosa. The control of the secretion by physiological factors would be the main research topic to enable an efficient control or elimination of BV, thereby relieving the suffering of millions of women.

References

1. SOGC Clinical Practice Guidelines No. 14 March 1997. Bacterial vaginosis.
2. Priestley, Cecilia JF, and GR Kinghorn. "Bacterial Vaginosis." *British Journal of Clinical Practice* 50, no. 6 (September 1996): 331-34.
3. Larsson, P.G. Treatment of bacterial vaginosis. *Int. J. STD AIDS* 1992; 3: 239 – 47
4. *Gardnerella vaginalis (2003)* M. J. PICKETT, JAMES R. GREENWOOD, SYDNEY M. HARVEY
http://141.150.157.117:8080/prokPUB/chaphtm/040/01_00.htm.
5. Henrik Schmidt, personal communication.
6. Bendesky, A.; Menéndez, D. & Ostrosky-Wegman, P. (2002): Is metronidazole carcinogenic? *Mutation Research* 511, p 133 – 144.