Brazilian Journal of Biology®

ISSN 1519-6984 (Print)
ISSN 1678-4375 (Online)

Notes and Comments

Microorganisms causing vulvovaginitis: analysis of 1,688 cervicovaginal cytology

E. B. C. Pereira[a], C. N. Carvalho[a], A. P. M. Carvalho Neto[a], A. C. S. de Omena[a], P. K. A. Magalhães[b], M. G. S. Cavalcanti[c], G. C. Ferreira Júnior[d], J. G. Costa[e], B. C. de Omena[f], A. C. Silva[a], J. M. S. Santos[g] and T. J. M. Rocha[a,g*]

[a]Centro Universitário – CESMAC, Maceió, AL, Brasil

[b]Instituto Federal de Alagoas – IFAL, Maceió, AL, Brasil

[c]Universidade Federal da Paraíba – UFPB, João Pessoa, PB, Brasil

[d]Instituto Federal do Acre – IFAC, Mestrado Profissional em Propriedade Intelectual e Transferência de Tecnologia para a Inovação – ProfNIT, Rio Branco, AC, Brasil

[e]Empresa Brasileira de Pesquisa Agropecuária – EMBRAPA, Centro de Pesquisa Agropecuária dos Tabuleiros Costeiros, Campus Delza Gitai, Rio Largo, AL, Brasil

[f]Secretaria de Estado de Saúde de Alagoas – SESAU, Maceió, AL, Brasil

[g]Universidade Estadual de Ciências da Saúde de Alagoas – UNCISAL, Maceió, AL, Brasil

The vaginal microbiota is formed by several aerobic, anaerobic and facultative bacteria, being considered one of the most important defense mechanisms of the reproductive function, as it prevents the growth of pathogenic microorganisms (Resende et al., 2019). The bacterial microbiota in the vagina of a healthy woman of reproductive age is dominated by lactobacilli (Wójkowska-Mach et al., 2021). Lactobacilli produce lactic acid as a result of the fermentation of carbohydrates, mainly glycogen, present in the vaginal epithelium of women at menarche. This acidic environment provides protection against infectious diseases by preventing the vaginal colonization of potential pathogens (Kalia et al., 2020).

Among reproductive tract infections, vulvovaginitis and vaginosis stand out, processes in which the vaginal microbiota is altered, thus allowing the proliferation of other microorganisms and may be associated with an inflammatory process (vaginitis) or without any evidence of inflammation (vaginosis) (Linhares et al., 2018). The entry of microorganisms into the female genital tract is influenced by several physical, behavior and physiological factors. Among the physical factors, we commonly have: sexual activity, number of sexual partners, phase of the menstrual cycle, immunity, age and the anatomical location of the female genital tract (Oliveira and Carneiro, 2020).

Vulvovaginitis or vaginosis are the most common causes of pathological vaginal discharge, and consequently are the most frequent causes of gynecological complaints. The most common pathogens are *Gardnerella vaginalis*, *Candida* sp. and *Trichomonas vaginalis*, the last two being the main etiological agents of vaginal candidiasis and trichomoniasis, respectively (Rodrigues et al., 2022).

G. vaginalis is an anaerobic and immobile Gram-variable pleomorphic bacillus. It is a vaginal commensal commonly isolated in women of reproductive age, being the main organism responsible for bacterial vaginosis (Wong et al., 2022). It is currently present in 95-100% of cases of bacterial vaginosis, being the main cause of vaginal discharge complaints among women of reproductive age (Jesus et al., 2021). It may be asymptomatic or present clinical symptoms such as grayish-white vaginal discharge with an unpleasant odor (Cruz et al., 2020). In the Pap smear test, *G. vaginalis* appears in the form of leucorrhea and cellular alterations of great diagnostic value called "guide cells" (Lopes et al., 2020). Vulvovaginal candidiasis is an infection, in which about 70% of the female population will have at least one episode of the disease during their reproductive life, and is therefore considered the second leading cause of vaginitis (Cruz et al., 2020). Vaginal candidiasis is caused by the opportunistic yeast *Candida* sp., an agent that makes up the normal human microbiota, and which, depending on predisposing factors, grows excessively, causing imbalance in the vaginal microbiota. Candidiasis can be asymptomatic, but it usually causes redness, itching, pain, whitish and thick vaginal discharge and a burning sensation (Dutra et al., 2023). In clinical practice, women diagnosed with candidiasis are those whose identification of *Candida* sp. Are an occasional finding in the routine examination (Pap smear test), or women who went to the office presenting the first symptoms and those who have a history of recurrent episodes of candidiasis (Cruz et al., 2020).

T. vaginalis is a flagellate protozoan, being the etiological agent of trichomoniasis, whose reservoir in women is the uterine cervix, vagina and urethra. *T. vaginalis* infection is a sexually transmitted infection (STI), with a non-viral characteristic, which is the most prevalent in the world (França et al., 2022). Trichomoniasis appears as an asymptomatic infection in 10-50% of cases. The most common symptoms are vaginal discharge with a foul odor and greenish-yellow colors, itching, dysuria and abdominal discomfort (Freitas et al., 2020).

*e-mail: tmatosrocha@cesmac.edu.br; thiago.matos@uncisal.edu.br
Received: May 26, 2023 – Accepted: August 22, 2023

The most used method for diagnosis is fresh microscopy, in which the parasite is observed with pendulum movements (sensitivity of 51% to 65%). Microscopy with Gram staining also allows the identification of *T. vaginalis*, in this case, immobile (Linhares et al., 2018).

Due to the high prevalence of these vaginal agents, and how important their complications are when undiagnosed, knowledge about the subject and awareness of the importance of performing routine cytological examinations is of great importance. The analysis was carried out through a descriptive retrospective, cross-sectional study with a quantitative approach in 1,688 cervicovaginal cytology exams in a Clinical Pathology Laboratory in the city of Maceió-AL from September/2018 to September/2019. All results of cytological tests were filed in the Laboratory's operating system. Patients who underwent cytological examination outside the research period were not included in the research, thus being an exclusion criteria. The results regarding the presence of microbiological agents (*G. vaginalis*, *Candida* sp. and *T. vaginalis*), were distributed by age group. The following ranges were analyzed: 14 to 34 years old, 35 to 49 years old and 50 to 75 years old.

During the studied period, 1.688 Pap smear exams of women aged between 14 and 88 years were registered by the operating system of the Adolf Lutz Clinical Pathology Laboratory. The age range of positive cases were divided into 4 groups, 14 – 34 years old (Group 1), 35 – 49 years old (Group 2), 50 – 70 years old (Group 3) and 71 – 88 years old (Group 4).

A total of 1.688 cytological exams were analyzed, with 23.45% (396 out of 1688) being the total percentage of positive cases for *G. vaginalis*, *Candida* sp. *T. vaginalis* and association of cocci and/or bacilli with *Candida* sp. Table 1 shows the number of positive cases according to age group, where women aged 14 – 34 years old had the highest number of positivity, followed by women aged 35 – 49 years old and patients aged between 50 – 70 years old. For women over 71 years old, it was possible to observe a decrease in positive cases which according to Nascimento et al. (2022) there is a lower demand for cytological examination, in the age group between 66 and 84 years.

The higher prevalence of infections in young women may be related to high hormone levels, which would be associated with the etiopathogenesis of infections. Another explanation would be the existence of risk factors, such as the early onset of sexual activity, the use of the IUD and the use of oral contraceptives, as well as the large number of sexual partners (Resende et al., 2019).

In many gynecological services, vaginal discharge is the main complaint of women assisted, followed by itching and vaginal odor, these symptoms generally indicative of vulvovaginitis and can interfere with their sexual intercourse and their quality of life. Given these considerations, the prevention and early identification of vulvovaginitis can be identified as one of the gynecological priorities in women's health care, in order to offer adequate treatment for each scenario (Carvalho et al., 2022).

In all 396 positive cases, it can be observed that 55.30% (219/396) of the cases were positive for *G. vaginalis*, 40.40% (160/396) positive cases for *Candida* sp. Associated with cocci and/or bacilli, 16.28% (13/396) positive cases only for *Candida* sp. and 1.01% (4/396) cases for *T. vaginalis*, not being observed only candidiasis or trichomoniasis in women over 50 years old. In the study carried out by Rodrigues et al. (2022) and Silveira et al. (2022) the most prevalent microorganisms were similar to those observed in the present study.

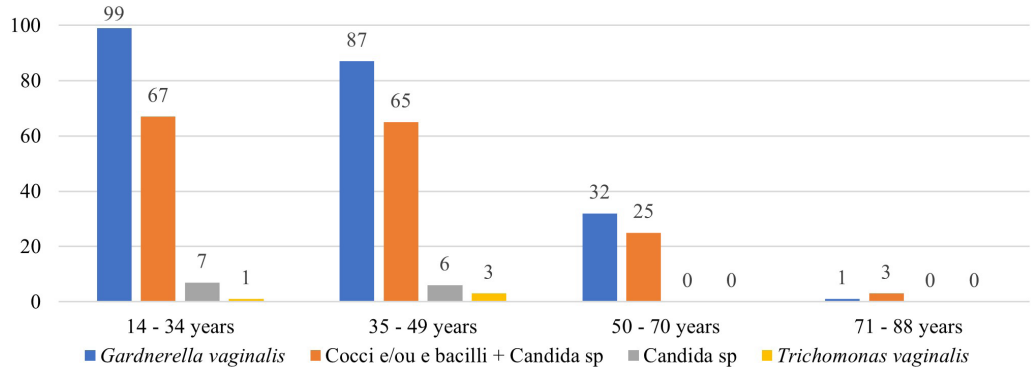
In Graph 1, the prevalence of positive cases for the different infectious agents according to the age group can be observed, also observing that there were cases of association of cocci and/or bacilli and *Candida* sp.

In Brazil, bacterial vaginosis, mainly represented by *G. vaginalis*, is very frequent, affecting approximately 45% of women with a complaint of vaginal discharge, and may also be present even in asymptomatic women, affecting approximately 10% to 30% of pregnant women and 10% of women assisted in primary care (Alves et al., 2021). According to Silveira et al. (2022) *G. vaginalis* is one of the reasons that most lead women to the gynecologist. In the study carried out by Rodrigues et al. (2022) there was also a prevalence of *G. vaginalis* infections, representing 14.2% of the analyzed cases of women who sought care at a Basic Health Unit (BHU).

In this study, a total of 43.68% (173/396) positive reports for *Candida* sp. With and without association with cocci and/or bacilli were identified, being a proportionally higher result when compared to the study by Carvalho et al. (2022), which showed the presence of this pathogen in 5.01% of 18,645 reports analyzed. However, even with the relatively lower prevalence of this microorganism, the study by Carvalho et al. (2022) concluded that *Candida* sp. Was the second most found agent, as well as this study. In addition, about 75% of adult women have at least one case of fungal vulvovaginitis in their lives, where 40 to 50% of them will have new outbreaks, and if symptoms are present, fungal vulvovaginitis can be confirmed through tests that identify the etiological agent, such as a cytological examination.

Table 1. Prevalence of vulvovaginitis and vaginosis in patients, according to age group, who underwent cytological examination in a laboratory in Maceió-AL, from September/2018 to September/2019.

Age group	Positive tests (Total 396 tests)	%
14 – 34 years old	174	10.30
35 – 49 years old	161	9.53
50 – 70 years old	57	3.37
71 – 88 years old	4	0.23



Graph 1. Prevalence of etiological agents that causes vulvovaginitis and vaginosis in patients, related to age group, who underwent cytological examination in a laboratory in Maceió-AL, from September/2018 to September/2019.

Another infectious agent diagnosed by the Pap smear test is *T. vaginalis*, a flagellate protozoan, commonly found in the lower level of the genitals of women. Although Nascimento et al. (2022) demonstrated a prevalence of 13.76% of cases for trichomoniasis, in a sample of 129 cytologies, in this study a much lower rate was observed, with only 1.01%, similar to the work by Alves et al. (2021), who noted a 2% prevalence of this pathogen in 1,095 reports analyzed. One of the reasons for the low prevalence of this pathogen may be that according to Carvalho et al. (2022), this infection is transmitted almost exclusively during sexual intercourse.

Most affected women were young with an active sex life, aged between 14–34 years old. The highest prevalence was for *G. vaginalis*, followed by *Candida* sp. and *T. vaginalis*. Regarding the method applied for the study, the Pap smear test, a test primarily used to screen precursor lesions of cervical cancer, is effective for detecting infectious agents, representing a valuable instrument for the diagnosis of these infections.

Vaginal discharge is a very common symptom in women and may or may not be associated with sexually transmitted infections. It is important to know the cause and perform the appropriate treatment to reduce the risk of possible transmission and dissemination of the causative agent. The high rate of positivity for vaginal infections caused by *G. vaginalis*, *Candida* sp and *T. vaginalis* points to the need for greater monitoring and guidance regarding the prevention of these infections. The periodicity of the exams directly influences the reduction of cases of vaginitis.

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