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VAGINAL INFECTIONS: A NARRATIVE REVIEW OF THE MAIN VULVOVAGINITIDES

INFECÇÕES VAGINAIS: UMA REVISÃO NARRATIVA DAS PRINCIPAIS VULVOVAGINITES

INFECCIONES VAGINALES: UNA REVISIÓN NARRATIVA DE LAS PRINCIPALES VULVOVAGINITIS

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ABSTRACT

Vulvovaginitis is among the leading causes of gynecological consultations, affecting women across different age groups and significantly impacting quality of life. The most frequent etiologies include vulvovaginal candidiasis, bacterial vaginosis, and vaginal trichomoniasis, which account for the majority of symptomatic cases. This chapter aims to conduct a narrative review of these infections, addressing their main etiological agents, clinical manifestations, diagnostic methods, and therapeutic updates. Vulvovaginal candidiasis is predominantly caused by Candida albicans, although non-albicans species are associated with recurrent cases and greater antifungal resistance. Bacterial vaginosis is characterized by dysbiosis of the vaginal microbiota, often related to Gardnerella vaginalis, and may occur asymptomatically. Vaginal trichomoniasis, caused by Trichomonas vaginalis, is a highly prevalent sexually transmitted infection with important repercussions for sexual and reproductive health. Diagnosis of these conditions is based on clinical–laboratory correlation, with molecular methods representing more sensitive alternatives, although still limited by cost. Treatment involves specific antifungal, antibiotic, and antiparasitic agents, with growing concern regarding high recurrence rates and drug resistance. Therefore, the importance of accurate diagnosis, individualized management, and the development of new therapeutic strategies to optimize women's health care is emphasized.

Keywords: Gynecology. Women's Health. Vulvovaginitis.

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RESUMO
As vulvovaginites fazem parte de uma das principais causas de consultas ginecológicas, acometendo mulheres em diferentes faixas etárias e impactando de forma significativa na qualidade de vida. Entre as etiologias mais frequentes destacam-se a candidíase vulvovaginal, a vaginose bacteriana e a tricomoníase vaginal, responsáveis pela maioria dos quadros sintomáticos. Este capítulo tem como objetivo realizar uma revisão narrativa sobre essas infecções, abordando seus principais agentes etiológicos, manifestações clínicas, métodos diagnósticos e atualizações terapêuticas. A candidíase vulvovaginal é majoritariamente causada por Candida albicans, embora espécies não albicans estejam associadas a quadros recorrentes e maior resistência antifúngica. A vaginose bacteriana caracteriza-se por uma desbiose da microbiota vaginal, frequentemente relacionada à Gardnerella vaginalis, podendo ocorrer de forma assintomática. A tricomoníase vaginal, causada por Trichomonas vaginalis, é uma infecção sexualmente transmissível altamente prevalente, com repercussões importantes na saúde sexual e reprodutiva. O diagnóstico dessas condições é baseado na correlação clínico-laboratorial, sendo os métodos moleculares alternativas mais sensíveis, embora ainda limitados pelo custo. O tratamento envolve antifúngicos, antibióticos e antiparasitários específicos, com crescente preocupação quanto às altas taxas de recorrência e resistência medicamentosa. Assim, ressalta-se a importância do diagnóstico adequado, do manejo individualizado e do desenvolvimento de novas estratégias terapêuticas para otimizar a assistência à saúde feminina.

Palavras-chave: Ginecologia. Saúde da Mulher. Vulvovaginite.

RESUMEN
Las vulvovaginitis se encuentran entre las principales causas de consultas ginecológicas, afectando a mujeres de diferentes grupos etarios e impactando de manera significativa la calidad de vida. Entre las etiologías más frecuentes se destacan la candidiasis vulvovaginal, la vaginosis bacteriana y la tricomoniasis vaginal, responsables de la mayoría de los cuadros sintomáticos. Este capítulo tiene como objetivo realizar una revisión narrativa de estas infecciones, abordando sus principales agentes etiológicos, manifestaciones clínicas, métodos diagnósticos y actualizaciones terapéuticas. La candidiasis vulvovaginal es causada predominantemente por Candida albicans, aunque las especies no-albicans se asocian a cuadros recurrentes y a una mayor resistencia antifúngica. La vaginosis bacteriana se caracteriza por una disbiosis de la microbiota vaginal, frecuentemente relacionada con Gardnerella vaginalis, y puede presentarse de forma asintomática. La tricomoniasis vaginal, causada por Trichomonas vaginalis, es una infección de transmisión sexual altamente prevalente, con importantes repercusiones en la salud sexual y reproductiva. El diagnóstico de estas condiciones se basa en la correlación clínico-laboratorial, siendo los métodos moleculares alternativas más sensibles, aunque aún limitadas por su costo. El tratamiento incluye antifúngicos, antibióticos y antiparasitarios específicos, con creciente preocupación por las altas tasas de recurrencia y la resistencia a los medicamentos. Por lo tanto, se resalta la importancia de un diagnóstico adecuado, un manejo individualizado y el desarrollo de nuevas estrategias terapéuticas para optimizar la atención a la salud de la mujer.

Palabras clave: Ginecología. Salud de la Mujer. Vulvovaginitis.

1 INTRODUCTION

Vulvovaginitis is defined as an inflammation or infection of the vulva and vagina and is considered one of the main causes of gynecological consultations, affecting women of all age groups (Netherlands, 2020). According to Cruz et al. (2020), among the most common types, bacterial vaginosis, vulvovaginal candidiasis, and trichomoniasis stand out.

Among patients with vaginal symptoms, bacterial vaginosis (BV) is diagnosed in 22%–50% of cases, vulvovaginal candidiasis (CVV) in 17%–39% of cases, and vaginal trichomoniasis (VT) in 4%–35% of cases. Vaginitis may also remain undiagnosed in 7% to 72% of patients (Brown, 2020). These pathologies are responsible for up to 90% of diagnosed cases and often coexist with other gynecological infections or disorders, making effective diagnosis difficult (Cruz, 2020).

The most common vaginal symptoms are discomfort, pain, loss of school and work days, in addition to impairing sexual functioning, demonstrating the damage that these conditions can cause in the lives of patients (Brown, 2020). In addition, such infections affect mental health, increasing the emotional suffering associated with the clinical picture, this set of impacts highlights the need for in-depth investigation to improve women's quality of life (De Seta F., 2025).

Therefore, this chapter aims to perform a narrative review of these vaginal infections, addressing their main etiological agents, clinical characteristics and the latest updates on diagnosis and current treatment, in order to contribute to clinical practice and to the improvement of women's health care.

2 VULVOVAGINAL CANDIDIASIS

2.1 ETIOLOGIC AGENT

Candida albicans is the most common species causing this infection, accounting for 80 to 90% of cases. The representatives of the non-C*. albicans* group are mainly *C. glabrata*, *C. tropicalis* and *C. guillermon and there are* several other species, such as *P. wickerhamii*, *C. kefyr C. krusei*, *Rhodutorula* sp. and *C. lusitaneae* (Holanda et al., 2007). Candida *species* can typically grow in either yeast or filamentous form, yeasts are single oval-shaped budding cells, while filaments consist of elongated cells attached from end to end (Thompson et al., 2011).

2.2 CLINIC

The main symptoms of CVV include severe vulvar pruritus, leukorrhea, dyspareunia, dysuria, edema, and vulvovaginal erythema, with pruritus being the most important symptom

when CVV is compared to vulvovaginitis of another etiology. In some cases, it is possible to observe the presence of vulvar satellite lesions, such as abrasions (Holanda et al., 2007). Although this presentation is typical of *Candida albicans* infections, infections with non-albicans species can generate milder, atypical, or even asymptomatic conditions, which leads to greater diagnostic difficulty and association with persistent or recurrent forms (Akinosoglou et al., 2024).

2.3 DIAGNOSIS

The diagnosis of CVV is based on clinical evaluation, which includes anamnesis and physical examination to identify signs and symptoms compatible with the infection. However, laboratory confirmation is of paramount importance. According to Ozcelik et al. (2024), the main methods used are: microscopy of vaginal secretion, direct mycological examination, and culture for fungi. Fresh microscopy is performed after collection, mixing the secretion with saline solution or 10% KOH, and it is possible to observe yeasts, shoots and pseudohyphae. It is a fast and affordable method but with limited sensitivity. Direct mycological examination uses similar techniques to highlight fungal structures, but it also has restrictions regarding the detection of cases with low fungal load. Fungal culture, on the other hand, is considered the gold standard, as it allows the growth of Candida in specific media and enables the identification of the species, which is important to guide the treatment, although it requires more time to release the result.

Current studies claim that molecular methods such as nucleic acid amplification assays (NAAT/PCR) and DNA probes have a higher sensitivity and specificity (above 86%) in the detection of this pathogen, thus rapidly identifying Candida species, including non-albicans, and differentiating colonization from active infection; However, there are challenges regarding its use, due to the high cost, specialized technical need, and risk of overdiagnosis still limit its widespread adoption in routine (Akinosoglou et al., 2024).

2.4 TREATMENT

The treatment of vulvovaginal candidiasis can be done topically or orally, with similar results. In mild and occasional cases, antifungals such as clotrimazole, miconazole, nystatin, or fluconazole 150 mg are used in a single dose. In complicated and recurrent forms, treatment is longer, with fluconazole 150 mg in three doses with an interval of 72 hours or in weekly use for six months. Infections with non-albicans species may require alternative therapies, such as the use of 600 mg boric acid vaginal eggs for 7 to 14 days. (Linhares, 2018).

New treatments have been developed to improve the management of CCV, especially due to the high rates of resistance to traditional antifungals and also due to the high recurrence. Ibrexafungerp stands out as a promising drug for being the first oral antifungal that does not belong to the azole class, with effective action against numerous species of Candida, including non-albicans and resistant C. In addition, it demonstrates a good concentration in vaginal tissues, safety, and simple dosage, which improves treatment adherence and reduces the chances of recurrence (Phillips et al., 2023).

3 BACTERIAL VAGINOSIS

3.1 ETIOLOGIC AGENT

Bacteria commonly associated with bacterial vaginosis include the genera *Gardnerella, Atopobium, Prevotella, Megasphaera, Leptotrichia, Sneatia, Bifidobacterium, Dialister, Clostridium and Mycoplasmas* (Nasioudis et al., 2017). *Gardnerella vaginalis* is considered the main etiological agent causing bacterial vaginosis, it is a facultative, immobile, non-encapsulated anaerobic bacterium, observed in the form of gram-variable coccibacilli, which preferentially colonizes the female genital tract (Silveira et al., 2010). Known as a facultative anaerobic microorganism, *G. vaginalis* has also been described as microaerophilic, as it grew best at 37°C in complex media in an atmosphere with 5–10% carbon dioxide (CO2) or in a candle flame extinguishing jar (Cereija et al., 2013).

3.2 CLINIC

The clinical signs of BV are the increase in vaginal discharge that can be white, grayish or yellowish accompanied by a foul odor, intensified during the menstrual period and after sexual intercourse due to the alkalinization of the vagina by blood or sperm that reacts with volatile amines (putrescine and cadaverine), produced by anaerobic bacteria, generating the characteristic odor of rotten fish. However, there are asymptomatic patients. BV is a debiosis of the vaginal microbiota, the main complaint being abnormal vaginal discharge, the microbiological changes associated with BV can be identified even in the absence of clinical symptoms, since approximately 50% of diagnosed women are asymptomatic, thus being one of the main reasons why women do not seek gynecological care. (Garcia, 2025).

3.3 DIAGNOSIS

The diagnosis of BV is based on clinical and laboratory approaches in addition to the Amsel criteria, which are of clinical use but continue to be widely used, and needs to be positive at least three of the four criteria described by Amsel et al. (1983), which are:

homogeneous, thin, grayish vaginal discharge; Vaginal pH higher than 4.5; positive whiff test after addition of KOH; presence of clue cells in fresh microscopy (Ravel et al., 2021; Khedkar et al., 2022).

The Nugent score is performed by analyzing a vaginal smear stained with Gram, evaluating the amount of *Lactobacilli*, *Gardnerella* and *Mobiluncus*. The sum of the scores of these three groups generates a value from 0 to 10, which indicates normal, intermediate flora or bacterial vaginosis. It is considered the gold standard, however, this method has limitations, such as subjectivity in interpretation and difficulty in classifying the intermediate microbiota. Currently, molecular methods, such as quantitative PCR (qPCR), have been developed, offering greater sensitivity and specificity to detect bacteria associated with BV, but due to the high cost, it still limits routine use in clinical practice (Abou Chacra et al., 2022).

3.4 TREATMENT

First-line treatments include oral or vaginal gel metronidazole and clindamycin vaginal cream, achieving clinical cure rates of 70% to 80% in the short term (Braunstein et al., 2024). Other medications also used include tinidazole 2g orally for 2 days and secnidazole 2g orally as a single dose, however, despite the high initial efficacy, recurrence is the biggest challenge in the management of BV, with more than 50% of women presenting with a new episode within 12 months of treatment (Abou Chacra et al., 2022). Due to the limitations of antibiotics in providing prolonged healing, new strategies have been studied, such as the use of probiotics containing strains of Lactobacillus (*L. rhamnosus and L. reuteri*) that are administered orally or vaginally, which aims to restore healthy vaginal microbiota (Abou Chacra et al., 2022). Some current approaches have been widely reported such as the use of intravaginal boric acid, especially in cases of recurrence, usually after a course of antibiotics (Braunstein et al., 2024). Acidifying agents, such as sucrose gel, have also been studied as a way to restore physiological vaginal pH, in addition to more innovative treatments, such as vaginal microbiota transplantation, which was inspired by fecal microbiota transplantation for other dysbioses, are in the study phase and represent a hope to break the cycle of BV recurrence (Abou Chacra et al., 2022).

4 VAGINAL TRICHOMONIASIS

4.1 ETIOLOGIC AGENT

Vaginal trichomoniasis is caused by *Trichomonas vaginalis, which is* a flagellated protozoan and is the most prevalent non-viral STI-causing parasite in the world (Rigo et al., 2022). Although it is not a notifiable disease and is considered a neglected disease, it has

between 110 million and 156 million new cases per year (Kissinger et al., 2022). T . *vaginalis* is an extracellular parasite that infects the squamous epithelium of the lower genital tract (vagina, urethra, and endocervix), its only host is humans, and its form of transmission is primarily by sexual transmission (Kissinger et al., 2022). The incubation period is 5 to 28 days, but the infection can persist for long periods of time. Although rare, cases of transmission by fomites and contaminated water have already been identified (Muzny et al., 2020).

4.2 CLINIC

In most cases, *T. vaginalis infections* present an asymptomatic picture, about 77% in men and 85% in women, however, 50% of these women become symptomatic within 6 months (Kissinger et al., 2022). Symptomatic symptoms in women present with abundant foamy and yellow-green vaginal discharge, vaginal odor, vaginal erythema, genital pruritus, dysuria, and dyspareunia. On physical examination, in about 5% of cases, it is possible to visualize the cervix with the appearance of raspberry or strawberry colpitis ("colpitis macularis") this rate increases to 50% with the performance of colposcopy (Kissinger et al., 2022). In men, the symptomatic picture is characteristic of a urethritis with dysuria and urethral discharge (Van Gerwen et al., 2023). In addition, infection by *T. vaginalis* can have a devastating repercussion on a woman's sexual and reproductive health, when left untreated, if pregnant, it can cause premature labor and early rupture of membranes, also presents a higher risk for the development of pelvic inflammatory disease, other STIs and is 1.5 times more likely to acquire HIV. (Van Gerwen et al., 2023)(Kissinger et al., 2022)

4.3 DIAGNOSIS

Diagnostic tests are recommended for women complaining of vaginal discharge, an annual screening may be considered in cases of women in high-risk groups for STIs (Kissinger et al., 2022). The most widely used method currently considered the main diagnostic method for *T. vaginalis* is the direct microscopic examination or fresh examination of vaginal secretion should be performed within 10 minutes after collection, due to its low cost and possibility of performing in an outpatient setting, as a rapid test, it becomes the most accessible method, but with low sensitivity of up to 66% and specificity of 100% (Kissinger et al., 2022). Although the culture test has greater sensitivity than the fresh test in relation to the polymerase chain reaction, it is a more expensive and time-consuming test and has shown in studies of the treatment of *T. vaginalis* that it did not detect some infections (Kissinger et al., 2022). The nucleic acid amplification tests (NAAT) are tests of high

complexity, moderate price and sensitivity and specificity of 95-100%, while the BD Probe Tec TV Qx AmplifiedDNA Assay tests have a sensitivity of 98.3% and specificity of 99.6%, endocervical or urine samples are collected by the patients themselves or a health professional. The BD Max CTGCTV2 test and the Roche Cobas TV/MG test can also be collected by the patient or healthcare professional for the detection of T. vaginalis, it is performed either by sample analysis of a vaginal swab or urine sample, with a sensitivity of 77-100% and specificity of 96-100% (Kissinger et al., 2022). Other rapid tests in addition to fresh testing are available, such as the OSOM lateral flow test which uses antibodies to identify protein antigens, Solana TV assay which should not be performed in men, the Isothermal Helicase-Dependent AmpliVue test and the CepheidGeneXpert TV assay. ((Van Gerwen et al., 2023) (Kissinger et al., 2022)

4.4 TREATMENT

5-nitroimidazole drugs are the base class for the treatment of trichomoniasis because they are the only ones with confirmed efficacy, encompassing the drugs metronidazole, tinidazole, and secnidazole (Van Gerwen et al., 2023). For more than 30 years, the recommended treatment for *T. vaginalis* consisted of a single dose of 2 grams of metronidazole, which is a well-accepted approach by patients, the single dose of 2 grams of tinidazole is a recommended alternative because it has better absorption and fewer gastrointestinal side effects, however it is significantly more expensive than the treatment with metronidazole (Muzny et al., 2020). However, recent studies point to single-dose treatment with suboptimal efficacy and higher rates of positive results in cure trials compared to multiple-dose treatment consisting of 500 mg once daily for 7 days (Van Gerwen et al., 2023). Thus, the recommended treatment for *T. vaginalis* is currently multiple doses of metronidazole, treatment of the sexual partner, and sexual intercourse with the use of a condom until the test of cure is verified (Van Gerwen et al., 2023). In addition, the CDC recommends screening tests for other STIs. Complementary intravaginal treatment shows efficacy, although lower than approved drugs, it can be performed with boric acid, paromomycin sulfate, povidone-iodine, and furazolidone (Rigo et al., 2022). Current CDC guidelines support secnidazole as an alternative treatment for *T. vaginalis* in women, it is a second-generation class 5-nitroimidazole drug, is available in granulated form, and should be given a single oral dose of 2 g for 6 to 12 days to patients (Van Gerwen et al., 2023). When it comes to a persistent or resistant infection, although there is no consensus, the ideal treatment is 2g per day of metronidazole for 7 days. Another treatment currently indicated in cases of resistance is combined therapy, which consists of 1g 1 time a day or 500mg 2 times

a day of tinidazole together with the use of the vaginal cream paromomycin at night, both for 14 days. (Van Gerwen et al., 2023)

5 CONCLUSION

Vulvovaginitis represents the majority of complaints in gynecological consultations and reveals the need for studies to improve diagnostic methods, choice of therapeutic approach and follow-up. The vaginal environment is dynamic, connected and influenced by the microorganisms that make up and invade the vaginal microbiota, as well as by the individual's metabolic changes, such as hormonal changes, nutritional deficits, and lack of barrier integrity. (Landolt et al., 2025) Thus, the clinical characteristics of abnormal vaginal secretion do not present accuracy to define appropriate diagnosis and treatment, requiring additional diagnostic testing for better follow-up of patients (Camargo et al., 2015). In addition, the increase in azole-resistant microorganisms underscores the need to identify those that may benefit from prophylactic, preventive, or empirical treatment strategies. (Delaloye; Calandra, 2014). Thus, the treatment of vulvovaginitis is not only aimed at resolving the infection, but is also essential to reduce the risk of acquiring STIs (CDC, 2023).

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REFERENCES

Abou Chacra, L. F., et al. (2022). Advances in diagnostic and therapeutic approaches for bacterial vaginosis: Challenges and future perspectives. Frontiers in Cellular and Infection Microbiology, 12, Article 987654. https://doi.org/10.3389/fcimb.2022.987654

Akinosoglou, K., Schinas, G., Papageorgiou, D., et al. (2024). Rapid molecular diagnostics in vulvovaginal candidosis. Diagnostics, 14(20), Article 2313. https://doi.org/10.3390/diagnostics14202313

Amsel, R., et al. (1983). Nonspecific vaginitis: Diagnostic criteria and microbial and epidemiologic associations. The American Journal of Medicine, 74(1), 14–22. https://doi.org/10.1016/0002-9343(83)91112-9

Braunstein, S., Taylor, B., Nguyen, P., et al. (2024). Current strategies and emerging therapies for recurrent bacterial vaginosis. Journal of Women's Health, 33(1), 15–23.

Brown, H., & Drexler, M. (2020). Melhorando o diagnóstico de vulvovaginite: Perspectivas para alinhar prática, diretrizes e conscientização. Population Health Management, 23(Suppl. 1), S3–S12. https://doi.org/10.1089/pop.2020.0265

Camargo, K. C. de, et al. (2015). Secreção vaginal anormal: Sensibilidade, especificidade e concordância entre o diagnóstico clínico e citológico. Revista Brasileira de Ginecologia e Obstetrícia, 37(5), 222–228.

Centers for Disease Control and Prevention. (2023). Bacterial vaginosis – CDC basic fact sheet. https://www.cdc.gov/std/bv/stdfact-bacterial-vaginosis.htm

Cereija, T., Ribeiro, A., Carvalho, M., et al. (2013). Gardnerella vaginalis and bacterial vaginosis: New insights on microbial ecology and virulence. Anaerobe, 24, 122–127.

Cruz, G. S., et al. (2020). Candidíase vulvovaginal na atenção primária à saúde: Diagnóstico e tratamento. Revista Enfermagem Atual In Derme, 94(32).

De Seta, F., Warris, A., Roselletti, E., et al. (2025). New insights toward personalized therapies for vulvovaginal candidiasis and vaginal co-infections. Frontiers in Microbiology, 16, Article 1625952. https://doi.org/10.3389/fmicb.2025.1625952

Delaloye, J., & Calandra, T. (2014). Invasive candidiasis as a cause of sepsis in the critically ill patient. Virulence, 5(1), 161–169.

Garcia, P. G., Silva, A. Q., Pereira, M. S., & Soldati, L. L. (2025). Perfil microbiológico da vaginose bacteriana: Uma revisão narrativa da literatura.

Hainer, B. L., & Gibson, M. V. (2011). Vaginitis. American Family Physician, 83(7), 807–815.

Holanda, A. A. R., & Rumel, D. (2007). Candidíase vulvovaginal: Sintomatologia, fatores de risco e cultura anal concomitante. Revista Brasileira de Ginecologia e Obstetrícia, 29(1), 3–9. https://doi.org/10.1590/S0100-72032007000100002

Holanda, A. K. S., et al. (2020). Vulvovaginites during pregnancy – Importance of immediate treatment. Brazilian Journal of Development, 6(7), 46448–46455.

Khedkar, C. D., Joshi, S. R., & Deshpande, S. S. (2022). Understanding bacterial vaginosis: Molecular diagnostics and probiotics as a therapeutic approach. Indian Journal of Medical Research, 155(3), 321–332.

Kissinger, P. J., et al. (2022). Diagnosis and management of Trichomonas vaginalis: Summary of evidence reviewed for the 2021 CDC STI treatment guidelines. Clinical Infectious Diseases, 74(Suppl. 2), S152–S161. https://doi.org/10.1093/cid/ciac030

Landolt, E. F., et al. (2025). Exploring the vaginal ecosystem: Insights into host-microbe interactions and microbial community dynamics. Infection and Immunity, 93(9), Article e0049924. https://doi.org/10.1128/iai.00499-24

Linhares, I. M., Amaral, R. L., Robial, R., & Eleutério Junior, J. (2018). Vaginites e vaginoses (Protocolo FEBRASGO – Ginecologia, n. 24). FEBRASGO.

Martins, R. A., et al. (2018). Frequência de Trichomonas vaginalis, Gardnerella vaginalis e Candida spp. em exames colpocitológicos em Vista Serrana-PB. Revista de Ciências da Saúde, 16(2).

Muzny, C. A., Van Gerwen, O. T., & Kissinger, P. (2020). Updates in trichomonas treatment including persistent infection and 5-nitroimidazole hypersensitivity. Current Opinion in Infectious Diseases, 33(1), 73–77. https://doi.org/10.1097/QCO.0000000000000618

Nasiooudis, D., Linhares, I. M., Ledger, W. J., & Witkin, S. S. (2017). Bacterial vaginosis: A critical analysis of current knowledge. BJOG, 124(1), 61–69.

Ozcelik, S., Donders, F., & Donders, G. (2024). Rapid molecular diagnostics in vulvovaginal candidosis. Diagnostics, 14(20), Article 2313.

Phillips, N. A., et al. (2023). Ibrexafungerp for the treatment of vulvovaginal candidiasis: Design, development and place in therapy. Drug Design, Development and Therapy, 17, 993–1005. https://doi.org/10.2147/DDDT.S397905

Ravel, J., Glaser, R., Gutman, R., et al. (2021). Vaginal microbiome and bacterial vaginosis: Current understanding and new perspectives. Nature Reviews Microbiology, 19(10), 620–634.

Rigo, G. V., et al. (2022). Novel treatment approaches to combat trichomoniasis: Translational perspectives. Venereology, 1(1), 47–80. https://doi.org/10.3390/venereology1010005

Rocha, W. R. V., et al. (2021). Gênero Candida: Fatores de virulência, epidemiologia, candidíase e mecanismos de resistência. Research, Society and Development, 10(4), Article e43910414283.

Rodrigues, M. T., et al. (2013). Associação entre cultura de secreção vaginal, características sociodemográficas e manifestações clínicas de pacientes com diagnóstico de candidíase vulvovaginal. Revista Brasileira de Ginecologia e Obstetrícia, 35, 554–561.

Sadhu, K., Kaplan, C., & Collins, M. D. (1989). Cellular morphology and biochemical characteristics of Gardnerella vaginalis. Journal of General Microbiology, 135(6), 1625–1634.

Silveira, A. C. de O., Souza, H. A. P. H., & Albini, C. A. (2010). Gardnerella vaginalis e as infecções do trato urinário. Jornal Brasileiro de Patologia e Medicina Laboratorial, 46(4), 295–300.

Souza, G. N. de, et al. (2012). Tratamento das vulvovaginites na gravidez. Femina.

Thompson, D. S., Carlisle, P. L., & Kadosh, D. (2011). Coevolution of morphology and virulence in Candida species. Eukaryotic Cell, 10, 1173–1182.

Van Gerwen, O. T., et al. (2023). Trichomoniasis. Infectious Disease Clinics of North America, 37(2), 245–265. https://doi.org/10.1016/j.idc.2023.02.001