International Journal of Pharmaceutical Drug Design
IJPDD (February, 2025)
ISSN: 2584-2897
Website: https://ijpdd.org/

DOI: 10.62896/ijpdd.2.2.1
Review

Candidal Vulvovaginitis: A Review of Causes, Symptoms, and Treatment

Adarsh Kumar*, Hakim Singh Rajput, Amresh Gupta, Shourya Pratap
Institute of Pharmaceutical Sciences and Research, Unnao (U. P)

Received: *05-12-2024* / ***Revised:*** *23-01-2025* / ***Accepted:*** *10-02-2025*
Corresponding Author: *Adarsh Kumar*
Email: *adarshvishwakrma76@gmail.com*
Conflict of interest: *Nil*

Abstract:
In clinical practice, vulvovaginitis is a prevalent issue, management is frequently hampered by a long history of ineffective treatments based on preliminary diagnoses. We discuss the most prevalent causes of recurrent vulvovaginitis, the necessary measures to establish a diagnosis, from the medical history to the extra tests required and the best therapeutic alternatives. The dermatologist is particularly interested in infectious, irritating, allergic, and hormonal reasons. Infection is the most common cause of these processes a frequent reason for delayed therapy; we shall focus on infectious etiologies and diagnosis.

Keywords: vulvovaginal candidosis, Trichomonas, bacterial vaginosis, allergic vulvovaginitis.

Introduction:

The vagina is a naturally occurring cavity that, under normal circumstances, is home to a significant number of commensal bacteria (about 109 colony forming units per gram of discharge), by generating hydrogen peroxide and lactic acid, these primarily belong to the genus Lactobacillus, which keeps the vagina pH acidic [1,2]. The luteal phase of the menstrual cycle, advanced age, diabetes mellitus, sexual activity, oral contraceptive use, pregnancy, the presence of necrotic tissue or foreign bodies, the use of antibiotics, and feminine hygiene products are some of the conditions that can cause this commensal flora to turn pathogenic [3,4]. The vulva can be impacted by dermatoses of different etiologies, just as the oral mucosa, and the dermatologist plays a crucial role in both diagnosing and treating these conditions [5].

A variety of symptoms, including leukorrhea, pruritus, discomfort, dysuria, and dyspareunia, are linked to vulvovaginitis, which is characterized as an inflammation of the vulva and vagina [6]. It accounts for 25% of consultations in primary care and specialty clinics, making it one of the most frequent reasons for gynecologic and dermatological consultations [7].

Fig 1. Symptoms, Causes and Prevention of Candidal Vulvovaginitis

Cases of noninfectious origin, such as allergic, irritating, traumatic, and hormonal etiologies, are differentiated from infectious vulvovaginitis, which is the most prevalent kind may or may not be sexually transmitted (Table 1). Psoriasis, atopic dermatitis, lichen simplex chronicus, seborrheic dermatitis, and lichen sclerosus are a few more prevalent dermatoses that can impact the vaginal area [8].

Table 1. Etiology of Vulvovaginitis

Infectious	Candida, Trichomonas, Gardnerella, and Chlamydia species, gonococcus, herpes
Irritant	Feminine hygiene products (tampons, sanitary napkins, and panty liners)
Allergic	Spermicides, underclothes, feminine hygiene products, vaginal douches, occupational exposure
Hormonal	Hypoestrogenism
Iatrogenic	Intrauterine devices, pessaries, chemical products
Traumatic	Foreign bodies
Dermatoses	Psoriasis, atopic dermatitis, lichen simplex chronicus, seborrheic dermatitis, and lichen sclerosus.

Diagnosis:

Reaching a diagnosis requires a thorough a rigorous clinical history that builds empathy with the patient it is necessary to consider the clinical manifestations (pain, pruritus, soreness, and dyspareunia); whether leukorrhea is present or absent; its characteristics (color, quantity, consistency, and smell); the affected area (vulva, vagina, or both); the duration of the symptoms (continuous or episodic); the time since onset; and the triggering factors (stress, menstruation, infections, antibiotics, or sexual activity) asking the patient about potential past, diagnosis, therapies, and the response of treatment. The type and frequency of sexual activity must be established, whether the partner has symptoms and has received treatment [9-12].

Physical Examination:

It is crucial to examine vagina, external genital area and vulva must be examined for areas of erythema, edema, fissures, and ulcers it is to find sensitive areas, a swab should be utilized using a speculum, samples are taken from the fornix and vaginal walls during gynecologic examination [13]. A smear of the vaginal exudate mixed with potassium hydroxide must be inspected under a microscope, the amine test must be carried out, and the vaginal pH must be assessed (in the secretions from the vaginal walls, not from the fornix) the results of the aforementioned tests are negative, vaginal culture for bacteria, fungus, and herpes virus [14, 15]. The pH of the vagina ranges from 4 to 5; it is neutral during menstruation and somewhat more acidic during the premenstrual than luteal phases, as well as during the pre pubertal and post menopausal phases [16-18].

Biopsies should also be performed if trophic changes or ulcers are noticed to detect disorders such as tumors, lichen simplex chronicus, lichen sclerosis et atrophicus, and squamous epithelial hyperplasia [19, 20]. The most frequent causes of recurrent vulvovaginitis are discussed in the sections that follow, with special attention to how to diagnose and treat them.

Infectious Vulvovaginitis:

Bacterial vaginosis (40–50%), candidiasis (20–25%), and trichomoniasis (15–20%) are the most prevalent types of infectious vulvovaginitis. Moreover, chlamydia, gonococcus, and herpes simplex should be considered [21, 22]. It has long been believed that the features of the vaginal discharge can help diagnose infections that are suspected as shown in **(Table 2).**

Table 2. Characteristics of Vaginal Discharge According to the Cause

	Quantity	**Color**	**Consistency**	**Smell**
Trichomoniasis	Increased	Greenish-yellow	Frothy	Foul odor
Vaginosis	Moderate	Grayish-white	Homogeneous-adherent	Foul odor (fishy)
Candidiasis	Low-moderate	Yellowish-white	Lumpy	No

Trichomonas Vaginitis:

Trichomonas vaginitis is a common sexually transmitted infection (STI) caused by *Trichomonas vaginalis*, a single-celled protozoan parasite it primarily affects the urogenital tract, leading to inflammation, discomfort, and increased susceptibility to other infections [23, 24]. *T. vaginalis* is one of the most prevalent non-viral STIs, affecting millions

of people annually specifically women are more frequently diagnosed due to symptomatic differences and routine gynecological screening. Risk factors include multiple sexual partners, unprotected intercourse, and co-existing sexually transmitted infections [25, 26]. The host of *T. vaginalis* adheres to vaginal and urethral epithelial cells, triggering an inflammatory response the parasite disrupts the normal vaginal microbiota by competing with beneficial lactobacilli, leading to pH imbalance and facilitating the overgrowth of other pathogens [27, 28]. This inflammatory environment increases the risk of complications such as pelvic inflammatory disease (PID) and adverse pregnancy outcomes [29, 30].

Candidiasis:

Candidiasis is a common fungal infection caused by *Candida* species, primarily *Candida albicans* naturally resides on human skin and mucosal surface, it can become pathogenic under specific conditions, leading to infections ranging from superficial to life-threatening systemic diseases [31, 32]. *C. albicans* is a commensal organism but can transition into a pathogenic form under favorable conditions this transition is driven by factors such as immune suppression, antibiotic use, and disruption of normal microbiota [33, 34]. The fungus exhibits morphological plasticity, switching between yeast and hyphal forms, enabling tissue invasion and immune evasion [35, 36].

Bacterial vaginosis:

Bacterial vaginosis (BV) is a common vaginal condition caused by an imbalance in the natural microbial community of the vagina instead of the usual dominance of Lactobacillus species, which help maintain an acidic environment which prevents infection over growth of anaerobic bacteria such as *Gardnerella vaginalis* or *Atopobium vaginae* [37, 38]. This shift leads to a higher vaginal pH, contributing to symptoms like a thin, grayish-white discharge with a fishy odor, while BV is not classified as a sexually transmitted infection, it is more common in sexually active individuals and can be influenced by factors like douching, hormonal changes, and antibiotic use [39]. BV is often asymptomatic but can increase the risk of complications, including susceptibility to sexually transmitted infections, pregnancy-related issues like preterm birth, and recurrent infections [40, 41]. Diagnosis is typically based on clinical criteria (Amsel's criteria) or molecular tests, and treatment usually involves antibiotics like metronidazole or clindamycin, though recurrence is common [42, 43].

Conclusions:

The following should be considered when assessing the outcomes of the diagnostic procedures and therapies used to manage these patients: A problem for the patient or medical personnel vulvovaginitis is prevalent the diagnosis must so be established, and primary care of physicians, gynecologists, and dermatologists should involved in more than 30% of cases are undiagnosed of vulvovaginal, self-medication by many women with persistent vaginal and vulval symptoms using topical medications (antibiotics, antifungal agents, corticosteroids, and combinations) and systemic treatments may obscure or worsen the symptoms, making identification challenging. Some patients may have more than one reason of their symptoms, and each of these causes needs to be addressed.

References:

1. Barrientos-Durán, A., Fuentes-López, A., Plaza-Díaz, J., & García, F. (2020). Reviewing the Composition of Vaginal Microbiota: Inclusion of Nutrition and Probiotic Factors in the Maintenance of Eubiosis. *Nutrients*, *12*(2), 419. https://doi.org/10.3390/nu12020419
2. Virtanen, S., Rantsi, T., Virtanen, A., Kervinen, K., Nieminen, P., Kalliala, I., & Salonen, A. (2019). Vaginal Microbiota Composition Correlates Between Pap Smear Microscopy and Next Generation Sequencing and Associates to Socioeconomic Status. *Scientific Reports*, *9*(1), 1-9. https://doi.org/10.1038/s41598-019-44157-8
3. Abt, M. C., & Pamer, E. G. (2014). Commensal bacteria mediated defenses against pathogens. *Current Opinion in Immunology*, 16. https://doi.org/10.1016/j.coi.2014.03.003
4. Kaper, J. B., Nataro, J. P., & Mobley, H. L. (2004). Pathogenic Escherichia coli. *Nature Reviews Microbiology*, *2*(2), 123-140. https://doi.org/10.1038/nrmicro818
5. Prabhu S, Krishna S. Vulvar inflammatory disorders: A review. *J Skin Sex Transm Dis* 2022; 4:188-95.
6. Raef, H. S., & Elmariah, S. B. (2021). Vulvar Pruritus: A Review of Clinical Associations, Pathophysiology and Therapeutic Management. *Frontiers in Medicine*, 8, 649402. https://doi.org/10.3389/fmed.2021.649402
7. Mancusi, S., & Neto, C. F. (2010). Inpatient dermatological consultations in a university hospital. *Clinics*, *65*(9), 851. https://doi.org/10.1590/S1807-59322010000900007

8. Hildebrand JP, Carlson K, Kansagor AT. Vaginitis. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 https://www.ncbi.nlm.nih.gov/books/NBK470302/
9. Tayyeb M, Gupta V. Dyspareunia. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025. https://www.ncbi.nlm.nih.gov/books/NBK562159/
10. Neal, C. M., Kus, L. H., Eckert, L. O., & Peipert, J. F. (2020). Noncandidal vaginitis: a comprehensive approach to diagnosis and management. *American journal of obstetrics and gynecology*, *222*(2), 114–122. https://doi.org/10.1016/j.ajog.2019.09.001
11. Paladine, H. L., & Desai, U. A. (2018). Vaginitis: Diagnosis and Treatment. *American family physician*, *97*(5), 321–329. PMID: 29671516
12. Russo, R., Superti, F., Karadja, E., & De Seta, F. (2019). Randomised clinical trial in women with Recurrent Vulvovaginal Candidiasis: Efficacy of probiotics and lactoferrin as maintenance treatment. *Mycoses*, *62*(4), 328–335. https://doi.org/10.1111/myc.12883
13. Bialy A, Kondagari L, Wray AA. Gynecologic Pelvic Examination. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2025. https://www.ncbi.nlm.nih.gov/books/NBK534223/
14. Kelly KG. Tests on Vaginal Discharge. In: Walker HK, Hall WD, Hurst JW, editors. Clinical Methods: The History, Physical, and Laboratory Examinations. 3rd edition. Boston: Butterworths; 1990. Chapter 179. https://www.ncbi.nlm.nih.gov/books/NBK288/
15. Jishna P, Khader A, Dipin P, Bindu V. Point-of-care testing in a patient with vaginal discharge. *J Skin Sex Transm Dis* 2024; 6:80-2. https://doi.org/10.25259/JSSTD_5_2023
16. Lin, P., Chen, C., Cheng, M., & Shen, J. (2021). Vaginal pH Value for Clinical Diagnosis and Treatment of Common Vaginitis. *Diagnostics*, *11*(11), 1996. https://doi.org/10.3390/diagnostics11111996
17. Murta, E. F., Filho, A. C., & Barcelos, A. C. (2005). Relation between vaginal and endocervical pH in pre- and post-menopausal women. *Archives of gynecology and obstetrics*, *272*(3), 211–213. https://doi.org/10.1007/s00404-005-0740-4
18. Holdcroft, A. M., Ireland, D. J., & Payne, M. S. (2023). The Vaginal Microbiome in Health and Disease—What Role Do Common Intimate Hygiene Practices Play? *Microorganisms*, *11*(2), 298. https://doi.org/10.3390/microorganisms11020298
19. Marfatia, Y., Surani, A., & Baxi, R. (2019). Genital lichen sclerosus et atrophicus in females: An update. *Indian Journal of Sexually Transmitted Diseases and AIDS*, *40*(1), 6. https://doi.org/10.4103/ijstd.IJSTD_23_19
20. Charifa A, Badri T, Harris BW. Lichen Simplex Chronicus. In: StatPearls Treasure Island (FL): StatPearls Publishing; 2025 https://www.ncbi.nlm.nih.gov/books/NBK499991/
21. Huang, H., Hsu, C., Lee, F., Fan, M., Tseng, W., Chen, H., Shen, H., Lee, Y., Tai, T., Hsu, M., & Hung, C. (2023). Prevalence, Associated Factors, and Appropriateness of Empirical Treatment of Trichomoniasis, Bacterial Vaginosis, and Vulvovaginal Candidiasis among Women with Vaginitis. *Microbiology Spectrum*, *11*(3), e00161-23. https://doi.org/10.1128/spectrum.00161-23
22. Bautista, C. T., Wurapa, E., Sateren, W. B., Morris, S., Hollingsworth, B., & Sanchez, J. L. (2016). Bacterial vaginosis: A synthesis of the literature on etiology, prevalence, risk factors, and relationship with chlamydia and gonorrhea infections. *Military Medical Research*, *3*, 4. https://doi.org/10.1186/s40779-016-0074-5
23. Schumann JA, Plasner S. Trichomoniasis. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 https://www.ncbi.nlm.nih.gov/books/NBK534826/
24. Kissinger, P. (2015). Epidemiology and Treatment of Trichomoniasis. *Current Infectious Disease Reports*, *17*(6), 484. https://doi.org/10.1007/s11908-015-0484-7
25. Cudmore, S. L., & Garber, G. E. (2010). Prevention or treatment: The benefits of Trichomonas vaginalis vaccine. *Journal of Infection and Public Health*, *3*(2), 47-53. https://doi.org/10.1016/j.jiph.2010.01.003
26. Helms, D. J., Mosure, D. J., Metcalf, C. A., Douglas, J. M., Jr, Malotte, C. K., Paul, S. M., & Peterman, T. A. (2008). Risk factors for prevalent and incident Trichomonas vaginalis among women attending three sexually transmitted disease clinics. *Sexually transmitted diseases*, *35*(5), 484–488. https://doi.org/10.1097/OLQ.0b013e3181644b9c
27. Petrin, D., Delgaty, K., Bhatt, R., & Garber, G. (1998). Clinical and Microbiological Aspects of Trichomonas vaginalis. *Clinical Microbiology Reviews*, *11*(2), 300. https://doi.org/10.1128/cmr.11.2.300

28. Mercer, F., & Johnson, P. J. (2018). Trichomonas vaginalis: Pathogenesis, Symbiont Interactions, and Host Cell Immune Responses. *Trends in parasitology*, *34*(8), 683–693. https://doi.org/10.1016/j.pt.2018.05.006
29. Jennings LK, Krywko DM. Pelvic Inflammatory Disease. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2025. https://www.ncbi.nlm.nih.gov/books/NBK499959/
30. Marcinkowski, K. A., Mehta, V., Mercier, R., & Berghella, V. (2022). Pelvic inflammatory disease in pregnancy: a systematic review focusing on perinatal outcomes. *American journal of obstetrics & gynecology MFM*, *4*(4), 100643. https://doi.org/10.1016/j.ajogmf.2022.100643
31. R AN, Rafiq NB. Candidiasis. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2025. https://www.ncbi.nlm.nih.gov/books/NBK560624/
32. Talapko, J., Juzbašić, M., Matijević, T., Pustijanac, E., Bekić, S., Kotris, I., & Škrlec, I. (2021). Candida albicans—The Virulence Factors and Clinical Manifestations of Infection. *Journal of Fungi*, *7*(2), 79. https://doi.org/10.3390/jof7020079
33. Neville, B. A., & Bougnoux, M. (2015). Candida albicans commensalism in the gastrointestinal tract. *FEMS Yeast Research*, *15*(7). https://doi.org/10.1093/femsyr/fov081
34. Proctor, D. M., Drummond, R. A., Lionakis, M. S., & Segre, J. A. (2023). One population, multiple lifestyles: Commensalism and pathogenesis in the human mycobiome. *Cell Host & Microbe*, *31*(4), 539-553. https://doi.org/10.1016/j.chom.2023.02.010
35. Lopes, J. P., & Lionakis, M. S. (2021). Pathogenesis and virulence of Candida albicans. *Virulence*, *13*(1), 89. https://doi.org/10.1080/21505594.2021.2019950
36. Löffler, J., & Ebel, F. (2018). Size matters – how the immune system deals with fungal hyphae. *Microbes and Infection*, *20*(9-10), 521-525. https://doi.org/10.1016/j.micinf.2017.11.010
37. Kairys N, Carlson K, Garg M. Bacterial Vaginosis. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2025. https://www.ncbi.nlm.nih.gov/books/NBK459216/
38. Mondal, A. S., Sharma, R., & Trivedi, N. (2023). Bacterial vaginosis: A state of microbial dysbiosis. *Medicine in Microecology*, *16*, 100082. https://doi.org/10.1016/j.medmic.2023.100082
39. Javed, A., Parvaiz, F., & Manzoor, S. (2019). Bacterial vaginosis: An insight into the prevalence, alternative treatments regimen and it's associated resistance patterns. *Microbial Pathogenesis*, *127*, 21-30. https://doi.org/10.1016/j.micpath.2018.11.046
40. US Preventive Services Task Force. Screening for Bacterial Vaginosis in Pregnant Persons to Prevent Preterm Delivery: US Preventive Services Task Force Recommendation Statement. *JAMA.* 2020; 323(13):1286–1292. https://doi.otg/10.1001/jama.2020.2684
41. Nelson, D. B., & Macones, G. (2002). Bacterial Vaginosis in Pregnancy: Current Findings and Future Directions. *Epidemiologic Reviews*, *24*(2), 102-108. https://doi.org/10.1093/epirev/mxf008
42. Colonna C, Steelman M. Amsel Criteria. In: StatPearls. Treasure Island (FL): StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK542319/
43. Abou Chacra, L., Fenollar, F., & Diop, K. (2022). Bacterial Vaginosis: What Do We Currently Know? *Frontiers in Cellular and Infection Microbiology*, *11*, 672429. https://doi.org/10.3389/fcimb.2021.672429

*****