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Cytolytic vaginosis - diagnostics and treatment

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ABSTRACT

Cytolytic vaginitis (CV) is a vaginal inflammation that is difficult to diagnose. Due to overlapping clinical symptoms, it is similar to vulvovaginal candidiasis (VVC) or bacterial vaginosis (BV). It is characterized by excessive growth of Lactobacillus bacteria (especially Lactobacillus crispatus). It leads to a significant decrease in vaginal pH and epithelial cytolysis. Women have symptoms such as itching, burning, dyspareunia, and abnormal vaginal discharge. An accurate diagnosis requires assessment of vaginal pH and characteristic microscopic test results. The lack of an accurate diagnosis results in unnecessary antifungal or antibacterial treatment, which worsens the patient's symptoms. In addition, it contributes to the increase in antibiotic resistance. An effective form of treatment for CV is alkalization of the vaginal environment, most often with sodium bicarbonate-based solutions or gels. Preparations containing 4–5% sodium bicarbonate are a beneficial and safe treatment. In order to establish diagnostic criteria and treatment protocols, it is necessary to educate people about CV.

Keywords: cytolytic vaginosis, vulvovaginal candidiasis

1. INTRODUCTION

Cytolytic vaginosis (CV) is a little-known and controversial disease, rarely considered by doctors in women with symptoms of vaginitis and vulvitis. The current problem confronting doctors is making the correct diagnosis. Effective treatment is possible only after an accurate diagnosis has been made (Hacısalihoğlu & Acet, 2021). The disease is most often confused with vaginal lactobacillosis (Ventolini et al., 2022). Only after reviewing the patient's medical history and conducting laboratory tests can one distinguish between the two common causes of vaginal discharge with similar symptoms: lactobacillosis and cytolytic vaginitis. Symptoms such as itching, burning, dyspareunia, and white discharge result from very low pH and increased H_2O_2 production and often lead to misdiagnosis. In clinical practice, these patients are often misdiagnosed because doctors do not take into account the characteristic microscopic picture. Many of them rely solely on their clinical judgment rather than using high-quality microscopes and laboratory test results. The problem of misdiagnosis is exacerbated when patients assume that their symptoms are caused by a yeast infection. This leads them to request

prescriptions over the phone instead of seeking an in-person consultation. Laboratory tests are necessary for proper diagnosis and treatment (Cibley & Cibley, 1991; Qi et al., 2021). The review aims to discuss the clinical and pathological diagnostic and therapeutic approach to CV (Hacısalihoğlu & Acet, 2021; Kraut et al., 2023).

The purpose of this review is to highlight the problem of misdiagnosis of CV. It is important to compare the symptoms of various types of vaginitis and to note the differences between them, which are essential for an accurate diagnosis. Further randomized trials are necessary to establish guidelines for diagnosis and treatment.

2. REVIEW METHODS

The studies cited in this review were selected from PubMed, Google Scholar and Scopus databases to January 2026. The keywords used for the search included: "cytolytic vaginosis" and "vulvovaginal candidiasis". We included original papers and case reports, only written in English. The selection process followed the PRISMA 2020 guidelines. Figure 1 shows the step-by-step inclusion and exclusion process.

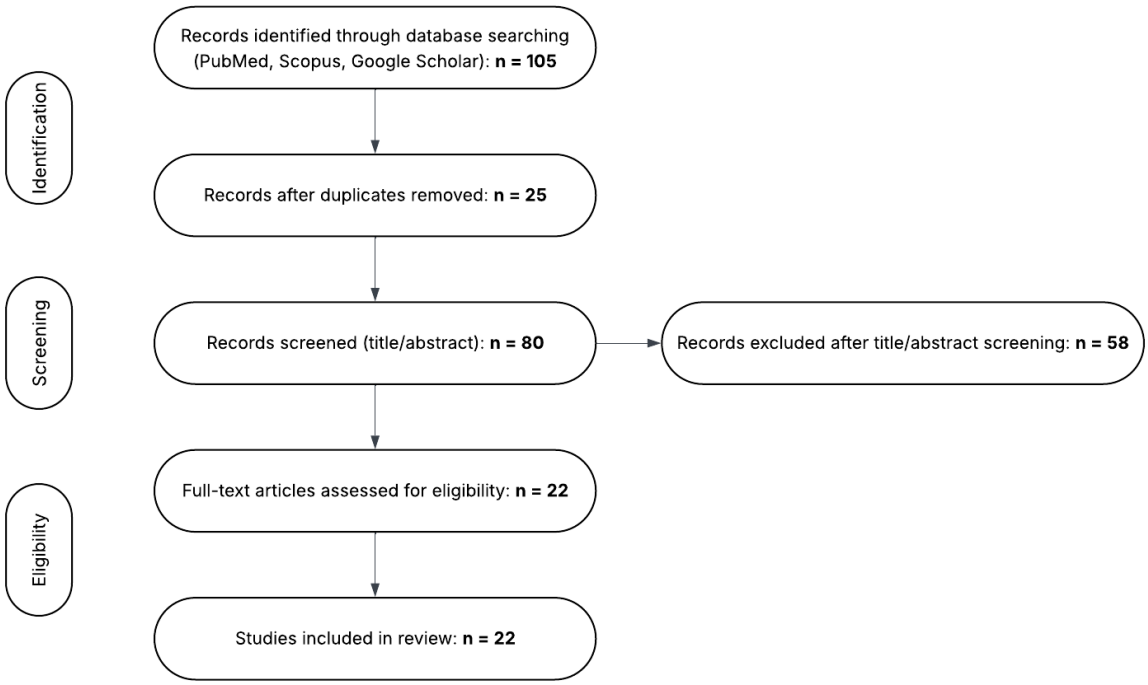

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Figure 1. PRISMA flow diagram.

3. RESULTS & DISCUSSION

Etiology and diagnosis

The pathogenesis of CV may be partly based on excessive growth of L. crispatus with increased acid production capacity. A 2020 pilot study evaluated the microbiological composition in patients with Lactobacillus overgrowth and the variability of the Lactobacillus microbiome in CV. Lactobacillus bacteria were in the vaginal secretions of 70 healthy women and 79 patients with cardiovascular disease. The isolation of 2 or more Lactobacillus species in a vaginal sample was significantly less frequent in the CV group compared to the healthy control (HC) group. In addition, the bacterial species differed between the groups. Lactobacillus crispatus was more frequently detected in the CV group and tended to produce more acid (Yang et al., 2020).

Women with vulvovaginal candidiasis (VVC), CV, and without vaginal infection and dysbiosis had specific characteristics of the lipid profile of vaginal secretions. The results varied, confirming that different clinical conditions have distinct metabolic backgrounds. Women with CV had increased lipid concentrations. It is associated with excessive bacterial growth and lipid metabolism disorders. This information suggests that the disease is dysbiosis rather than a classic infection.

In comparison, women with VVC had elevated levels of lipids associated with oxidative stress, inflammatory processes, and apoptosis, suggesting increased epithelial cell damage and an active inflammatory response to fungal infection. In women from the control group, lipids associated with the integrity of the vaginal epithelial barrier predominated, indicating normal mucosal function and the absence of destructive processes. Lipidomic analysis of vaginal secretions may in the future be a diagnostic tool for differentiating between these diseases (Sanches et al., 2018).

A prospective diagnostic study conducted in 2025 included 81 women with symptoms of vaginitis and 30 without symptoms. The aim was to determine which patients had CV; the diagnosis was positive in 32.1% of them. They made their diagnosis based on low vaginal pH, presence of numerous lactobacilli, cytolysis of vaginal epithelium, "false flag" cells, and naked nuclei in Gram staining. The symptoms in these patients were vaginal discharge (they did not differentiate CV from other forms of inflammation), itching, and painful urination (Kömeç et al., 2025).

Another study from 2020 analyzed the vaginal contents of 24 women to determine differences in the clinical, microscopic, and biochemical characteristics of CV and VVC. Vaginal samples were important for pH analysis, Gram staining, and specific fungal culture. Both women with CV and VVC had lumpy vaginal discharge and vaginal hyperemia. The inflammatory process was more intense in the VVC group. In the CV group, the number of lactobacilli, vaginal epithelial breakdown, and vaginal pH were significantly higher than in a control group (Sanches et al., 2020).

Treatment

The most commonly recommended method of treating CV is alkalization of the vaginal environment. The essence of the therapy is to increase the pH and reduce the number of lactic acid bacteria. Patients should use sitz baths or irrigations with sodium bicarbonate solutions. Studies prove the effectiveness of this method. Cerikcioglu et al. demonstrated clinical improvement in patients using baking soda irrigation (Cerikcioglu & Beksac, 2004). Shopova (2001) reported the resolution or alleviation of symptoms in 32 out of 47 women after using this method. Lapina et al., (2020) observed that 10 days of sitz bath therapy with added sodium bicarbonate resulted in a 95% reduction in symptoms, primarily dyspareunia, vaginal discharge, and severe discomfort.

Currently, patients use vaginal gels containing sodium bicarbonate due to their effectiveness and ease of use (Tomás et al., 2021). The alkaline nature of the solutions is crucial for neutralizing excess lactic acid in the vagina (Kömeç et al., 2025). Lower concentrations of 4% sodium bicarbonate have an alkalizing effect that is just as effective as concentrations of 6–7%. In addition, it simultaneously reduces the preparation's osmolality (Palacios et al., 2023). It is important for safety reasons, as high osmolality of vaginal products is associated with an increased risk of vaginal epithelial irritation and is not recommended for long-term use (Tp et al., 2026).

Table 1. Treatment of CV with sodium bicarbonate.

Method	Authors	Treatment effect
$NaHCO_3$ irrigations	Cerikcioglu and Beksac (2004)	Clinical improvement
$NaHCO_3$ irrigations	Shopova (2001)	Remission/alleviation of symptoms in 32/47 women
$NaHCO_3$ sitz baths (10 days)	Hacisalihoglu and Acet (2021)	Improvement of >95% of symptoms
Preparations with alkaline pH	Lapina et al., (2020)	Complete resolution of symptoms, normalization of pH
$NaHCO_3$ vaginal gels (4-5%)	formulation testing	Effectiveness + improved safety
$NaHCO_3$ gels (4%)	in vitro / ex vivo studies	Inhibition of L. crispatus, no histotoxicity

Sodium bicarbonate solutions and gels effectively inhibit the growth and eliminate Lactobacillus crispatus strains in both healthy women and patients with CV. The gel base without sodium bicarbonate showed no antimicrobial activity. Cytotoxicity analyses performed in accordance with ISO 10993-5 showed a correlation between sodium bicarbonate concentration and decreased epithelial cell viability (Shapiro et al., 2022). The 4% and 5% formulations had the most favorable safety profile. They are effective and also exhibit lower cytotoxicity (Palacios et al., 2023).

In addition, gels containing 4% sodium bicarbonate inhibit the adhesion of Lactobacillus crispatus to epithelial cells. They compete for binding sites and limit colonization of the epithelial surface (Gaspar et al., 2024). It may reduce risk of CV recurrence. Table 1 summarizes CV treatment with sodium bicarbonate.

Because CV is a rare condition, there are few robust, large-scale randomized clinical trials available regarding its treatment. Researchers currently draw conclusions from case series and observational data. Clinicians also rely on intuition and clinical experience rather than strong evidence when choosing therapies. In addition, there is a lack of data on the persistence of treatment efficacy and the risk of recurrence. It is important to distinguish CV from BV despite similar symptoms.

Due to their different pathogenesis, the treatment of oral mucositis differs significantly from that of candidal vaginitis. In CV, there is no infection with fungi or classic bacterial pathogens. Still, excessive growth of lactic acid bacteria plays a key role, leading to overproduction of lactic acid, lowering of the vaginal pH, and cytolysis of epithelial cells. For this reason, standard antifungal treatment is ineffective and may worsen symptoms.

Treatment of CV should focus on temporary alkalization of the vaginal environment rather than antifungal therapy. Both traditional sodium bicarbonate solutions and modern gel formulations show high therapeutic efficacy. Preparations containing 4–5% sodium bicarbonate appear to be the most promising. They are effective, safe, and comfortable to use, but should not be used long-term without further research (Komec & Aydin, 2025).

If treatment is ineffective—raising the vaginal pH through sitz baths or vaginal soda suppositories—after 2-3 weeks, a patient should repeat diagnostic tests. Since CV treatment protocols do not include antimicrobial drugs, differentiating CV from other drugs used to treat vaginitis will prevent unnecessary use of antimicrobial drugs and recurrent symptoms (Cibley & Cibley, 1991).

4. CONCLUSION

Clinicians often overlook CV when diagnosing recurrent symptoms of vaginitis. Studies indicate that CV is a vaginal dysbiosis characterized by excessive growth of Lactobacillus bacteria, excessive acidification of the vaginal environment, and epithelial cytolysis. It is not an infectious process. It is essential to assess the vaginal pH and identify characteristic microscopic changes. The abundant presence of Lactobacillus bacteria, cytolysis, and the absence of pathogenic microorganisms suggest a diagnosis of CV. Treatment involves temporarily alkalizing the vaginal environment using sodium bicarbonate-based preparations.

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Authors' Contributions

Karolina Dudek, Jan Błażukiewicz and Patrycja Wójcikiewicz performed the literature search, collected and compiled data, and drafted the manuscript. Natalia Gierulska, Bartosz Dudek, Maria Materek, Gabriela Zakrzewska and Damian Wach assisted with organization of the reviewed studies, editing, and formatting of the manuscript. Rafał Tarkowski and Krzysztof Kułak conceived the idea of the review, supervised the project, provided critical revision of the manuscript, and approved the final version. All authors read and approved the final manuscript.

Informed consent

Not applicable.

Ethical approval

Not applicable. This article does not contain any studies with human participants or animals performed by any of the authors.

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Conflict of interest

The authors declare that they have no conflicts of interest, competing financial interests or personal relationships that could have influenced the work reported in this paper.

Data and materials availability

All data associated with this study will be available based on the reasonable request to corresponding author.

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