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Genital cutaneous candidiasis versus chronic recurrent vulvovaginal candidiasis: distinct diseases, different populations

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SUMMARY Vulvovaginal candidiasis (VVC) affects over half of women during their lifetime. There are two categorization systems for VVC: uncomplicated versus complicated and acute versus recurrent. Most uncomplicated or acute cases occur in postpubertal premenopausal girls and women as sporadic vaginitis due to *Candida albicans*. Complicated VVC includes recurrent, chronic, or severe cases, presence of non-*albicans* species, and/or disease occurring in people with diabetes, immunosuppression, or pregnancy. These classification systems fail to distinguish the two distinct clinical categories of genital candidiasis: estrogen-dependent VVC and estrogen-independent cutaneous candidiasis. These entities are characterized by different pathogenesis, patient demographics, predisposing conditions, symptoms, signs, investigations, differential diagnosis, treatment, and ancillary measures. The current international and national guidelines on VVC are inadequate in their description of the clinical presentation, role and limitations of culture, biopsy findings, and management of cutaneous candidiasis. Progress toward improved patient outcomes will require the interdisciplinary

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collaboration of researchers and guideline authors to separate these two entities, unify terminology for each, explore the roles of medications and comorbid dermatoses, detail pragmatic and accessible diagnostic processes, define treatment goals, and discuss the long-term management strategies pertinent to each condition.

KEYWORDS vulvovaginal candidiasis, cutaneous candidiasis, candidal intertrigo, genital mycosis, candidosis, vulva, yeast

INTRODUCTION

Vulvovaginal candidiasis (VVC) is a common condition, with over half of the women population experiencing at least one episode during their lifetime (1, 2). The current classification systems for VVC divide the disease into uncomplicated versus complicated or acute versus recurrent (3–10). The bulk of VVC cases is acute and uncomplicated, occurring in otherwise healthy premenopausal women as symptomatic vaginitis due to *Candida albicans*. Complicated VVC represents at least 10% of cases and encompasses recurrent, chronic, or severe disease, presence of non-*albicans* species, and/or association with diabetes, immunosuppression, or pregnancy (9, 11–13). While non-*albicans* species and *Saccharomyces cerevisiae* may be responsible for 5–15% of yeast-related vulvovaginal disease, their primary etiologic role is often difficult to establish; this review will focus on disease attributable to *C. albicans* (9, 13, 14).

These classification systems of uncomplicated versus complicated or acute versus recurrent VVC fail to distinguish the two clinically distinct categories of disease: estrogen-dependent VVC and estrogen-independent cutaneous candidiasis. The context of this failure is a clinical landscape complicated by uncertain disease prevalence, patient-initiated treatment, inadequate provider knowledge, medical silos, and complex pathogenic pathways (15–20). This narrative review provides a comprehensive description of the two disease entities and argues that using the same term for both phenomena dilutes our understanding of candidiasis as a skin condition (Fig. 1). We assert that the current VVC guidelines are insufficient to aid clinicians in the recognition, investigation, and management of the estrogen-independent candidal skin disease.

DISEASE DEFINITION AND CLASSIFICATION

International and national VVC guidelines vary in their classification system, definition of recurrent, chronic, and severe, requirement for confirmatory tests, inclusion of postmenopausal women as an affected group, and management recommendations (Table 1) (3–10). No VVC guideline explicitly names vulvar cutaneous candidiasis, illustrates it with a photograph, details the clinical presentation, and outlines its histopathologic features. An unintended result of this insufficient clinical guidance is the potential for the prolonged suffering of affected patients until they are assessed by a knowledgeable vulvovaginal specialist (21–23).

The United States (US) Centers for Disease Control and Prevention (CDC) guideline spearheaded the uncomplicated versus complicated categorization system. It notes that patients with severe cases, those with diabetes mellitus (DM), or those who are immunocompromised may require longer treatment but provides no other advice for non-responders, except the consideration of organism resistance and involvement of a specialist (3). The Infectious Diseases Society of America (IDSA) candidiasis guideline reiterates the CDC classification but provides few other details about definitions, demographics, and clinical presentation (4). The Society of Obstetricians and Gynecologists of Canada practice recommendations mirror the CDC, except for the use of four episodes as the threshold for recurrent VVC (RVVC) and the application of 'severe' as a descriptor for symptoms rather than signs (5). The International Society for the Study of Vulvovaginal Disease (ISSVD) recommendations also draw on the CDC guideline for the classification and definition of RVVC and management protocols (6). The ISSVD document describes a positive yeast culture as crucial before initiating therapy. A single

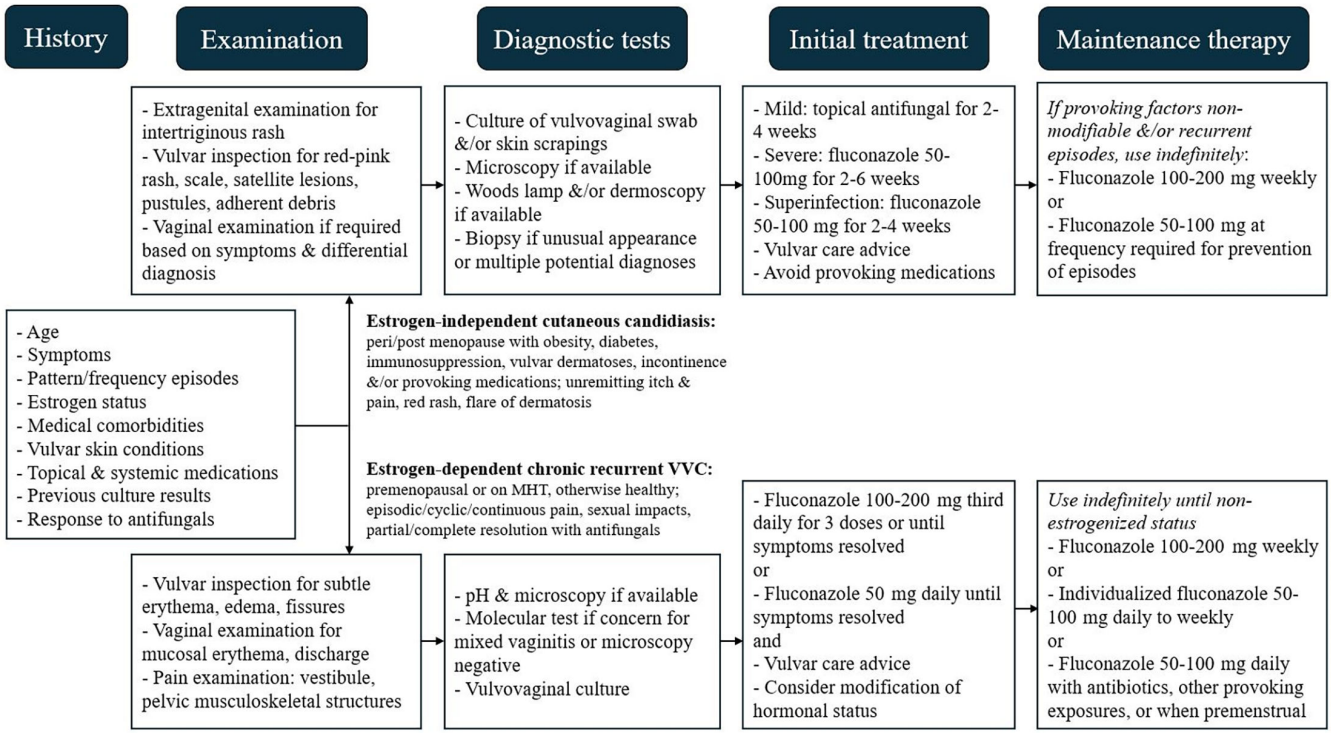

FIG 1 Algorithm comparing the clinical assessment and management of estrogen-independent cutaneous candidiasis versus estrogen-dependent chronic recurrent vulvovaginal candidiasis.

sentence addresses the descriptor as 'chronic': "Women with chronic VVC may possibly be a separate group from those with RVVC but should also be considered complicated." It does not describe candidiasis in non-estrogenized women, stating that VVC is less likely during menopause. The limited characterization of candidal skin disease combined with diagnostic and therapeutic inflexibility makes these four guidelines non-generalizable to postmenopausal or medically complex women and those with incomplete response to listed protocols.

The British Association for Sexual Health and HIV (BASSH) guideline does not endorse the uncomplicated versus complicated categorization, instead dividing the disease into acute with a subcategory of severe or recurrent (7). The authors expand on differential diagnosis with a tabulated comparison of lichen sclerosus, vulvodynia, contact dermatitis, and lichen simplex chronicus, describing these conditions as alternative considerations or coexisting pathologies. The BASSH guideline advises against culture for suspected acute VVC, citing the inability to differentiate commensals from pathogens, but does not elaborate that colonization with *C. albicans* is abnormal for non-estrogenized postmenopausal women. It requires confirmation of RVVC with microscopy on two or more occasions or at least one positive culture. The BASSH recapitulates CDC treatment recommendations for acute and recurrent VVC, except for specifying 150 mg fluconazole weekly dosing, mentioning hydrocortisone acetate cream for symptom relief in severe disease, and suggesting cetirizine 10 mg daily if patients report relapse between doses. The document describes "poor or partial response to therapy" as potentially due to non-*albicans Candida*, azole resistance, or erroneous initial diagnosis. It then introduces the concept of chronic, continuous symptoms that remit with antifungal therapy as a proposed distinct condition—chronic VVC—and states that further research is required to guide management. The Australian Electronic Therapeutic Guideline (eTG) reiterates the BASSH in definitions, confirmation, and treatment and likewise does not discuss candidal skin disease in non-estrogenized patients (8). The eTG describes chronic VVC (CVVC) as a "recognized…distinct condition" that occurs in young women, is often

TABLE 1 Comparison of the selected international and national guidelines on chronic and/or recurrent vulvovaginal candidiasis (VVC) due to *Candida albicans*, listed by year of publication[a]

Guideline name; publication year	Classification system	RVVC definition	Confirmation requirement	Vulvar skin findings	Definition of severe	Definition of chronic VVC (CVVC)	VVC after menopause	Predisposing factors	Initial fluconazole dose and duration	Maintenance therapy dose and duration	Indications for referral
Society of Obstetricians and Gynecologists of Canada; 2015 (5)	Uncomplicated or complicated	≥4 episodes per year	– Microscopy – Culture in complicated cases	– Erythema – Edema	Used as descriptor for symptoms	Not discussed	Not discussed	– Diabetes – Immunosuppression	150 mg three doses 72 h apart	– 150 mg weekly – Up to 6 months	Not discussed
Infectious Diseases Society of America; 2016 (4)	Uncomplicated or complicated	≥4 episodes per year	– Microscopy – Culture if microscopy-negative	Not discussed	Not discussed	Not discussed	Not discussed	– Diabetes	Unspecified dose for 10–14 days	– 150 mg weekly – 6 months	Not discussed
IUSTI/WHO guideline on the management of vaginal discharge; 2018 (10)	Vaginal candidosis or recurrent candidosis	≥4 episodes per year	Microscopy and ≥1 speciated culture	Not discussed	Not discussed	Pathologic host intolerance of candida	– Higher rates if on MHT	– Antibiotics – Immunosuppression/ corticosteroid use – Diabetes	150–200 mg daily for 3 days	– 100–200 mg weekly or ReCeDif[b] – 6–12 months	Not discussed
British Association for Sexual Health and HIV; 2019 (7)	Acute or Recurrent	≥4 episodes per year	≥2 events on microscopy or culture and ≥1 culture	– Erythema – Fissuring – Edema – Excoriation – Satellite lesions	Extensive vulvar skin findings	Continuous symptoms improve with menses, remit with antifungals	If on MHT	– Antibiotics – Immunosuppression – Estrogen	150 mg three doses 72 h apart	– 150 mg weekly – 6 months – Further research required for CVVC	Not discussed
United States Centers for Disease Control; 2021 (3)	Uncomplicated or Complicated	≥3 episodes per year	– Microscopy – Culture or PCR for complicated cases	– Erythema – Fissures – Edema – Excoriation	Extensive vulvar skin findings	Not discussed	Not discussed	– Antibiotics – Diabetes – Immunosuppression	100–200 mg three doses 72 h apart	– 100–200 mg weekly – 6 months	– Symptoms or positive culture despite therapy – Non-*albicans* species
Vulvovaginal candidiasis (AWMF 015/072, level S2k); 2021 (9)	Acute vaginitis or Chronic recurrent vulvovaginitis	≥4 episodes per year	None stated Options: – Microscopy – Culture – PCR	– Vesicular, eczematous, or follicular rash – Genitocrural and vulvar location after menopause	Used as descriptor for symptoms	Refers to RVVC arising from a combination of colonization and inalterable disposition	Yes	– Diabetes – Obesity – Genetics/ atopy – Antibiotics – Immunosuppression – Estrogen – IUD	200 mg three doses 72 h apart	ReCeDif[b] – 12 months	Not discussed
ISSVD; 2023 (6)	Uncomplicated or Complicated	≥3 episodes per year	None stated Options: – Microscopy – Culture – NAAT	– Erythema – Edema – Excoriations	Assess on semi-quantitative basis	May be a separate group	– Higher rates if on MHT	– Diabetes – Antibiotics – SGLT2i – Immunosuppression – Estrogen	150 mg three doses 72 h apart	– 150 mg weekly – 6 months	Not discussed

(*Continued on next page*)

TABLE 1 Comparison of the selected international and national guidelines on chronic and/or recurrent vulvovaginal candidiasis (VVC) due to *Candida albicans*, listed by year of publication[a] (*Continued*)

Guideline name; publication year	Classification system RVVC definition	Confirmation requirement	Vulvar skin findings	Definition of severe	Definition of chronic VVC (CVVC)	VVC after menopause	Predisposing factors	Initial fluconazole dose and duration	Maintenance therapy dose and duration	Indications for referral
Australian therapeutic guidelines; 2024 (8)	Initial/infrequent or Recurrent or Chronic	≥4 episodes per year	≥2 events on microscopy or culture	– Erythema – Fissuring – Edema – Excoriation	Extensive vulvar skin findings	Continuous symptoms improve with menses, remit with antifungals	– If on MHT – MHT may provoke chronic VVC	– Diabetes – Antibiotics – Immunosuppression – Estrogen	150 mg three doses 72 h apart	– 150 mg weekly – 6 months	– Suspected chronic VVC

[a]RVVC = recurrent vulvovaginal candidiasis, mg = milligram, IUSTI = International Union Against Sexually Transmitted Infection, WHO = World Health Organization, HIV = human immunodeficiency virus, MHT = menopausal hormone therapy, ISSVD = International Society for the Study of Vulvovaginal Disease, PCR = polymerase chain reaction, NAAT = nucleic acid amplification testing, and SGLT2i = sodium-glucose cotransporter 2 inhibitor.
[b]ReCeDif maintenance regimen is fluconazole 200 mg weekly for 2 months, then fortnightly for 4 months, then monthly for 6 months, with a decline in frequency for asymptomatic patients with negative microscopy and/or culture.

cyclic, and represents an irritant dermatitis to *Candida* yeast. It notes that menopause hormone therapy (MHT) may provoke CVVC in some users. The eTG advocates for referral to a dermatologist or a vulvar specialist for the diagnosis and management of CVVC, does not offer prescribing guidance, and cautions about fluconazole resistance. Both guidelines are limited by the inadequate acknowledgment of cutaneous candidiasis and a prescriptive approach to diagnosis and treatment.

The German and Swiss VVC guideline is published in a review article format with multidisciplinary authors (9). It defines VVC as an infection of the estrogenized vagina and vestibule that may spread over the labial, genitocrural, and perianal regions. It describes candidal rashes as vesicular, eczematous, or follicular and notes that postmenopausal women are more likely to demonstrate genitocrural involvement. It provides three distinct diagnostic categories—acute vaginitis, non-*albicans* vaginitis, and chronic recurrent VVC (CRVVC). It describes CRVVC as a chronic incurable disease in which antifungal cessation leads to short-term relapse in half of patients. The International Union Against Sexually Transmitted Infections (IUSTI) and World Health Organization (WHO) guideline on vaginal discharge reflects the German-Swiss approach to disease definition (10). It states that VVC rates are lower in postmenopausal women not on MHT. The authors advise assessment of CRVVC patients for predisposing conditions and consideration of lichen simplex chronicus and vulvodynia as coexisting or alternative diagnoses. Neither document discusses referral indications or management of patients non-responsive to standard protocols.

CLINICAL LANDSCAPE

Challenges in assessing prevalence

The prevalence of VVC is unknown due to difficulties in distinguishing colonization from disease, inconsistent terminology and categorization, self-diagnosis and treatment, patient presentation to varied health care settings, and erroneous case attribution (1, 16). There is scant information about candidiasis in gender-diverse people, including trans women (16, 24). Colonization with *C. albicans* is physiologic in between menarche and menopause; molecular testing methods document a point prevalence over 60% (25). Rates of vaginal colonization decline after menopause, but at least 10% of women with DM over age 50 demonstrate *Candida* species on culture (26). Initiation of a sodium-glucose co-transporter 2 inhibitor (SGLT2i) more than doubles this prevalence (27, 28). The vaginal colonization rate in elderly nursing home residents approaches one-third (29). Frequency estimates of cutaneous versus vulvovaginal disease vary by case definitions, populations, and study methodology; the overlap between the two categories of disease in pertinent studies is often unclear. As a result, a precise and accurate prevalence estimate remains elusive.

Patient experiences

Patient-initiated treatment for vulvovaginal complaints with over-the-counter antifungals is common but often unsuccessful due to incorrect presumptive self-diagnosis or inappropriate mode and duration of use (30–32). Half of postmenopausal women seeking gynecologic care have recently purchased one or more over-the-counter products to address vulvovaginal symptoms, of which 26% are antifungals (32). Among 475 women aged 18–60 years who purchased over-the-counter clotrimazole during the previous 6 months, 25% used it for isolated external symptoms and 45% for internal and external symptoms (33). The availability of 'microbiome' home-testing kits may exacerbate diagnostic misattribution through detection of candidal colonization or erroneous identification of dysbiosis (34–36).

Women's care-seeking experiences for genital concerns often involve multiple visits to a primary care provider (PCP) or gynecologist, not being examined, and undertaking repetitive laboratory studies (2, 16, 17). Many health professionals have limited training or experience in vaginitis and genital skin conditions, and provision of medication

without adequate evaluation may occur in over half of vulvovaginitis consultations (20, 37). Patients report frustration and disappointment at inadequate clinician knowledge, conflicting advice, and their symptoms being dismissed (19). Estimates of average delay in diagnosis for VVC range from 9 to 48 months (17, 22, 38). Empiric combination prescribing of topical corticosteroids, estrogen, antibiotics, and antifungals complicates the clinical picture through disease exacerbation, alteration of classic examination findings, or superimposition of contact dermatitis (2, 22). This shotgun treatment approach often increases patients' suffering and diminishes trust in the healthcare system. In response to medical system failings, women report self-management efforts to include online education, purchase of nutritional and herbal supplements, change in skin care practices, accessing naturopaths, and advocating for referral (17). When treatments have been unsuccessful, the initial clinician may refer to a dermatologist, sexual health physician, or gynecologist with an interest in the lower genital tract. While these specialists may be more knowledgeable about vaginal or skin conditions, relatively few practitioners have cross-disciplinary training across infectious, inflammatory, dermatologic, and neoplastic vulvovaginal diseases to inform accurate diagnosis and effective management (15, 19).

Role of medical silos

Genital candidiasis provides insight into the impacts of medical silos on clinical care. Gynecologists and sexual health physicians perform speculum examination, often in lithotomy position, with point-of-care testing to determine the presence and causation of vulvovaginitis. Traditional office-based testing involves a combination of vaginal pH, wet mount microscopy, and the 'whiff test.' Clinician adherence to this care standard is poor, with less than 50% of clinicians performing any diagnostic test and 21–42% of patients receiving inappropriate therapy (2, 39). Wet mount microscopy is not available in many care settings, requires training, and has positive and negative predictive values for VVC of 72 and 81%, respectively (34, 40). Molecular diagnostic tests promise better microbial pathogen detection rates but cannot distinguish colonization from disease and do not always provide species-specific identification. Vaginitis experts recommend a nuanced approach that combines traditional point-of-care tests, molecular diagnosis for trichomoniasis or mixed vaginitis, and culture when evaluating complex cases (34, 41). A narrow focus on vaginal examination and pathogen confirmation may hamper the recognition of vulvar and extragenital skin disease, leading to incomplete diagnosis and inadequate management.

Many dermatologists do not perform speculum examination or wet mount microscopy and instead promote comprehensive skin assessment as fundamental to the diagnostic process. Dermatologists routinely examine the scalp, ears, face, torso, extremities, hands, feet, and nails, with a focus on the flexural, extensor, and intertriginous zones. Genital examination often occurs in the frog-leg position, with left lateral used to optimally expose the perianus and intergluteal fold. Depending on lesion type, dermatologists may use a Wood's lamp to evaluate fluorescence or a dermoscope to provide magnification and polarized lighting (42). Dermatologists may obtain skin scrapings rather than a swab for microscopy and culture and undertake biopsy for unsure diagnosis, unusual skin features, or suspicion of overlapping diagnoses (43). This clinical approach likely improves the identification of candidal intertrigo and underlying or comorbid dermatoses but is less likely to detect vaginitis or sexually transmitted infections.

PATHOGENESIS

Candidiasis susceptibility represents a complex interaction between the host and the pathogen. Normal function of the local innate immune system involves achieving and maintaining a balance between reducing colonization and tolerating low levels of organisms. Varied manifestations of candidiasis arise from immune alterations manifesting as ineffective suppression or hypersensitivity, reflecting the genetically primed host

response (44). The interplay between these two seemingly antagonistic processes may explain the broad spectrum of candidal disease within and across individuals.

Ineffective suppression in acute and cutaneous candidiasis

Medical comorbidities associated with cutaneous candidiasis and acute VVC augment pathogen activity and reduce effective host response. Conditions favorable to yeast proliferation and spore-hyphae conversion involve a warm moist environment with plentiful carbohydrates available via a glucose-rich environment or intracellular glycogen (45). Accumulation of glycogen in vaginal keratinocytes coincides with postpubertal estrogen exposure; glycogen converts to glucose, yielding energy via anaerobic metabolism with lactic acid as a byproduct (46). Lysis of sloughed glycogen-rich keratinocytes and the resulting degradation products provide an energy source to *Candida* species (45). Metagenomic and metabolomic analyses suggest that glycolytic pathways are upregulated in VVC, and glucose, sucrose, and lactose are enriched in the vaginal microenvironment of acute disease (47). Systemic hyperglycemia inhibits neutrophil fungicidal activity, suppresses phagocytosis, and enhances adherence of *C. albicans* (48, 49). Inherent or acquired host immune deficiency of Th1/Th17 pathways results in deficient IL-17 response and may lead to diminished neutrophil recruitment and phagocytosis. Rates of candidiasis after antibiotic exposure range from 13 to 28% (50). Proposed mechanisms for this include depletion of local protective bacteria that provide competition or replication restraint on yeasts and antibiotic-related alteration of host gene expression and cytokine production. There is scant information about the role of the intertriginous skin microbiome in candidal infection (51).

Immune dysregulation and chronic recurrent vulvovaginal candidiasis

The dominant influence in chronic and/or recurrent VVC is an excessive, dysregulated immune response to low levels of *Candida* organisms (44, 52). The adaptive Th1-dependent immune system is not defective (53). Instead, loss of tolerance in otherwise healthy individuals occurs at multiple steps of the innate immune cascade and is modulated by single-nucleotide polymorphisms that alter and enhance inflammasome expression and increase cytokine production (54, 55). Alterations to the gene encoding mannose-binding lectin facilitate candidal colonization because ineffective protein-yeast binding reduces complement activation, phagocytosis, and opsonization (14, 44). An exaggerated monocyte-derived cytokine response to hyphae mediated by elevated tumor necrosis factor (TNF)α, interleukin (IL)1ß, and IL6 production produces symptoms of pruritus, erythema, and edema (44). The spectrum of disease susceptibility, severity, and treatment response likely arises from the type and number of polymorphisms. Antifungals offer control rather than cure by preventing colonization; the genetically based dysfunctional host-pathogen interaction is infrequently corrected by prolonged maintenance therapy (56).

The interaction between vaginal microbiome and VVC remains unclear and controversial (36). Patients with VVC show highly variable community patterns and may have increased α-diversity compared to unaffected women (36, 47). Results are conflicting about the association between RVVC and lactobacilli deficiency or relative abundance of *Lactobacillus iners* (14, 36, 47, 53).

ESTROGEN-INDEPENDENT CUTANEOUS CANDIDIASIS

Nomenclature and epidemiology

Several names exist for genital skin rash due to *Candida* species: candidal intertrigo, cutaneous candidiasis, secondary VVC, and genital mycotic infection (43). The ideal nomenclature would be gender-neutral, as this condition does not require a vagina or estrogen (57). Candidal rashes comprise 1 to 7% of outpatient dermatology encounters (58). The prevalence of intertrigo in large skin folds ranges from 6% of hospitalized patients to 20% of nursing home residents, with antimycotics as the most common

treatment modality (59). Common extragenital sites of candidal rash are the eyelids and retroauricular folds, axillae, abdominal or submammary folds, intergluteal crease, and inguinal folds (43). *Candida* balanitis refers to the involvement of the glans penis, while balanoposthitis extends over the glans and prepuce and almost exclusively affects uncircumcised men. Diabetes provides a two to ninefold increased rate of candidal balanitis exacerbated by poor glycemic control (48). Symptoms include pain and pruritus; examination shows erythema, adherent debris, pustules, erosions, and fissures. Men with candidiasis receive diagnosis and treatment from healthcare providers in 66% of cases compared to 74% of women (28). There are limited data about rates of relapse and requirement for intermittent or ongoing antifungal use in men.

Estrogen-independent vulvar cutaneous candidiasis usually occurs in postmenopausal women with obesity, DM, immunosuppression, incontinence, skin occlusion, immobility, and/or chronic dermatoses. Predisposing medications include topical corticosteroids, topical or systemic antibiotics, IL-17 inhibitors (IL17i), and SGLT2i (9, 21–23, 60–62). While not a requirement, exogenous estrogen and some selective estrogen receptor modulators may precipitate or exacerbate disease (26).

Symptoms and signs

Symptoms vary according to severity, sites involved, and comorbid conditions. Patients may report itch, burning, dysuria, sexual pain, redness, skin splits, and swelling (22, 48). Abnormal discharge is variably present and not usually the main complaint. Although some patients are unaware of the rash, most report discomfort that impacts daily activities and sleep. A common scenario in patients with underlying well-controlled dermatoses is the experience of a symptom flare that does not improve despite maintaining or increasing the topical steroid regimen. The literature provides minimal information about the frequency and duration of cutaneous candidiasis. It is likely that infection persists or worsens until the provision of adequate treatment and modification of provoking factors (21–23). Authors may use descriptors like 'recurrent' or 'chronic' in reference to cutaneous candidiasis when the clinical scenario instead reflects insufficient antifungal dose or duration or continued requirement for SGLT2i and immunosuppressive medications.

Skin affected by cutaneous candidiasis shows pink-red to violaceous patches and plaques often accompanied by satellite lesions, superficial pustules, peripheral scale, and adherent debris (Fig. 2a and b) (22, 43). Erythema may show a deeper purple-brown color in women with darker skin tones; the unfortunate dearth of clinical images depicting skin of color is common across vulvovaginal conditions (63). Fissures are common at the interlabial sulci, perineum, genitocrural folds, and the folds between the labia majora and the buttocks (48). Labia minora often are edematous, and maceration may occur, especially at the anterior commissure and periclitoral structures. Speculum examination may be normal. Features of candidiasis make it difficult to assess for the presence or control of underlying dermatoses. Examination of other intertriginous sites like the intergluteal and inframammary folds may reveal similar findings. In the presence of antibiotics, estrogen, potent topical steroids, and/or systemic immunosuppressives, the rash may demonstrate a deep red-purple color with diffuse edema, desquamation, erosions, or ulcers (Fig. 2c) (22, 57).

Diagnostic tests

Diagnostic strategies vary by specialist type and geographic region to include wet mount microscopy, molecular testing, vulvovaginal culture, and culture of skin scrapings. Despite the array of options, there are multiple barriers to diagnosis and confirmation of a *C. albicans*-related disease. Wet mount microscopy and molecular testing have limited international availability, cost and logistical concerns, and inherent test limitations. Vulvovaginal culture is infrequently performed in some jurisdictions, perhaps relating to a focus on microscopy and/or molecular testing, but allows for species identification and laboratory-dependent availability of sensitivity testing (16, 64, 65). The rate of

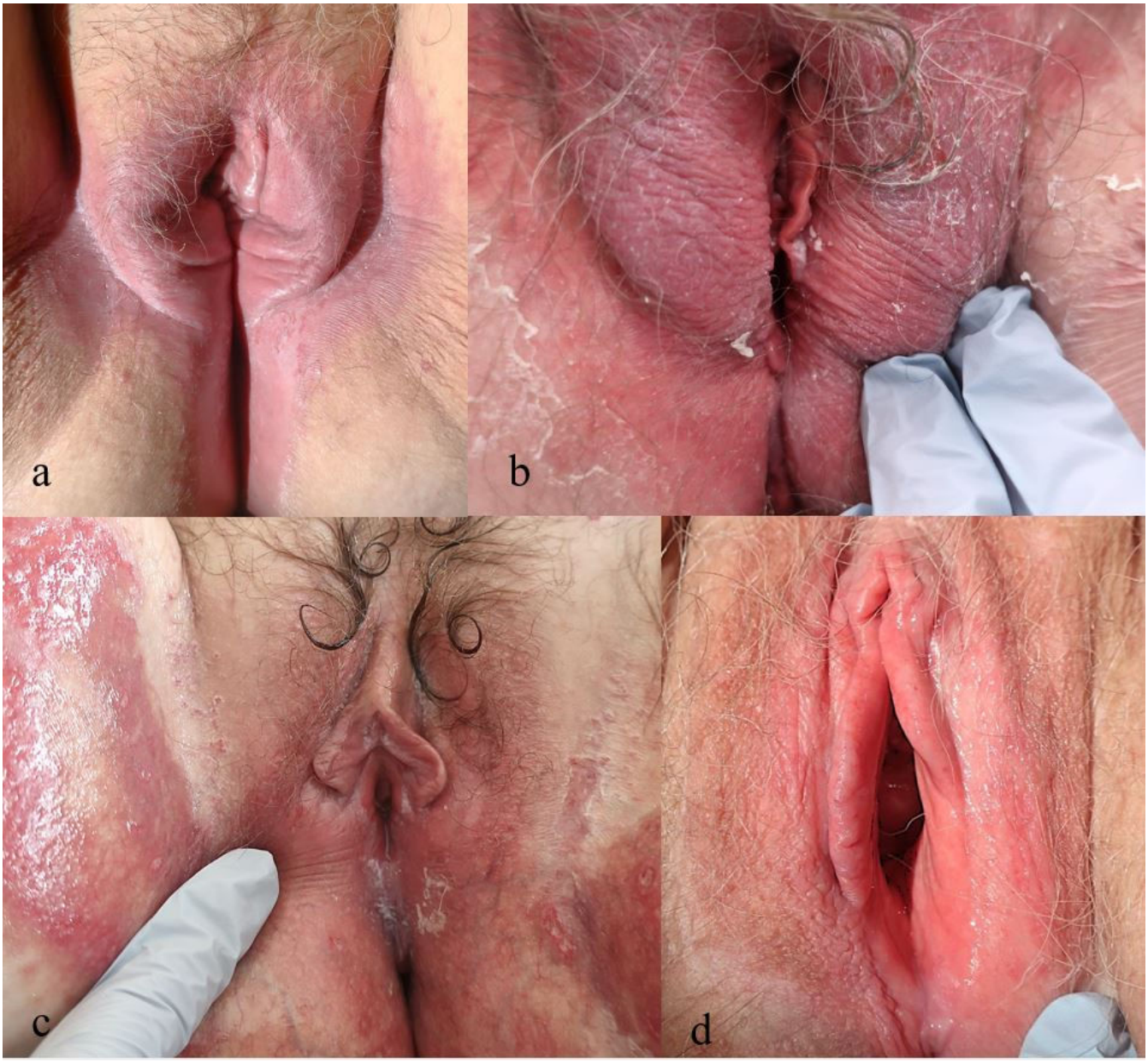

FIG 2 (a) Cutaneous candidiasis: vulvar erythema extending over the genitocrural and intergluteal folds with labial edema, adherent discharge, and satellite lesions. (b) Cutaneous candidiasis: vulvar erythema extending over the genitocrural folds with adherent discharge and peripheral scale. (c) Cutaneous candidiasis with iatrogenic exacerbation due to topical and systemic corticosteroids and antibiotics: violaceous non-contiguous rash distributed over the vulva, inner thighs, and perianus with erosions, maceration, and adherent discharge. (d) Lichen sclerosus with candidal superinfection: poorly demarcated erythema and labial edema superimposed on white color change and architectural alterations.

concordance between vaginal and vulvar skin cultures is unknown. Culture of skin scrapings is rarely performed outside of dermatology clinics and takes over 2 weeks to produce the result (42). Recent use of topical or oral antifungals may cause false negative cultures, with patients sometimes being unaware of their exposure due to use of commercially available combination creams (21, 22, 52, 61).

Skin biopsy is not necessary to diagnose mycosis but may be undertaken for suspicion of comorbid conditions, non-response to initial therapies, or unfamiliarity with clinical signs. Notation of clinical suspicion for candidiasis alerts the pathologist to request a periodic acid-Schiff (PAS) stain. The histopathologic appearance of mycosis is

the triad of corneal and/or subcorneal neutrophils, acanthosis, and dermal lymphocytic infiltrate (Fig. 3a) (21, 22). Other common features are parakeratosis or hyperkeratosis, suprapapillary thinning, spongiosis, and a basal proliferative zone. These microscopic findings are indistinguishable from vulvar psoriasis, unless fungal elements are present in the stratum corneum. Fungal elements establish the diagnosis of mycosis but do not distinguish between yeast and dermatophytes. They appear on PAS as small magenta-stained spherules and squiggles, often within corneal pustules (Fig. 3b). Fungal elements are sometimes detected on routine hematoxylin and eosin staining but more difficult to see than on PAS. The rate of detected fungal elements in biopsies of cutaneous candidiasis is unclear, with small studies reporting rates of 30–40% (22, 66).

Differential diagnosis

The clinical differential diagnosis of cutaneous candidiasis includes steroid overuse, dermatophytosis, bacterial intertrigo, erythrasma, psoriasis, irritant or allergic dermatitis, and drug eruption (67, 68). In patients treated for lichen sclerosus or lichen planus, poorly demarcated red patches due to topical steroid overuse may resemble candidiasis. Vulvar dermatophyte infection is difficult to distinguish from cutaneous candidiasis, with similar risk factors, symptoms, clinical appearance, distribution, and histopathology. Central clearing and dry fine scale are more characteristic of dermatophytosis than candidiasis, and patients with tinea genitalis may also have tinea pedis or onychomycosis (42). Pathogens responsible for dermatophytosis include *Trichophyton rubrum*, *Trichophyton mentagrophytes*, and *Epidermophyton floccosum*; these require culture of skin scrapings rather than vulvovaginal swab for detection. The sensitivity of culture is poor, with positive test rates of 14–83% (69–71). Dermatophytes respond to azoles and terbinafine but not to nystatin (72). While bacterial infections are usually distinguishable by acuity and culture results, the diagnosis of erythrasma requires Wood's lamp, skin scraping sent for Gram stain, or biopsy demonstrating *Corynebacterium minutissimum* highlighted by methenamine silver (73). Inverse psoriasis mimics candidiasis with symptoms of pain or itch, exacerbation with heat, and intertriginous location of demarcated erythema, maceration, and fissures (67). Patient history of irritant or allergen exposures and the corresponding rash distribution facilitates the identification of contact dermatitis, which otherwise shows similarities of red-pink color, edema, fissures, and trauma from rubbing or scratching. While psoriasis shares histologic features with mycosis, dermatitis instead shows a spongiotic tissue reaction sometimes accompanied

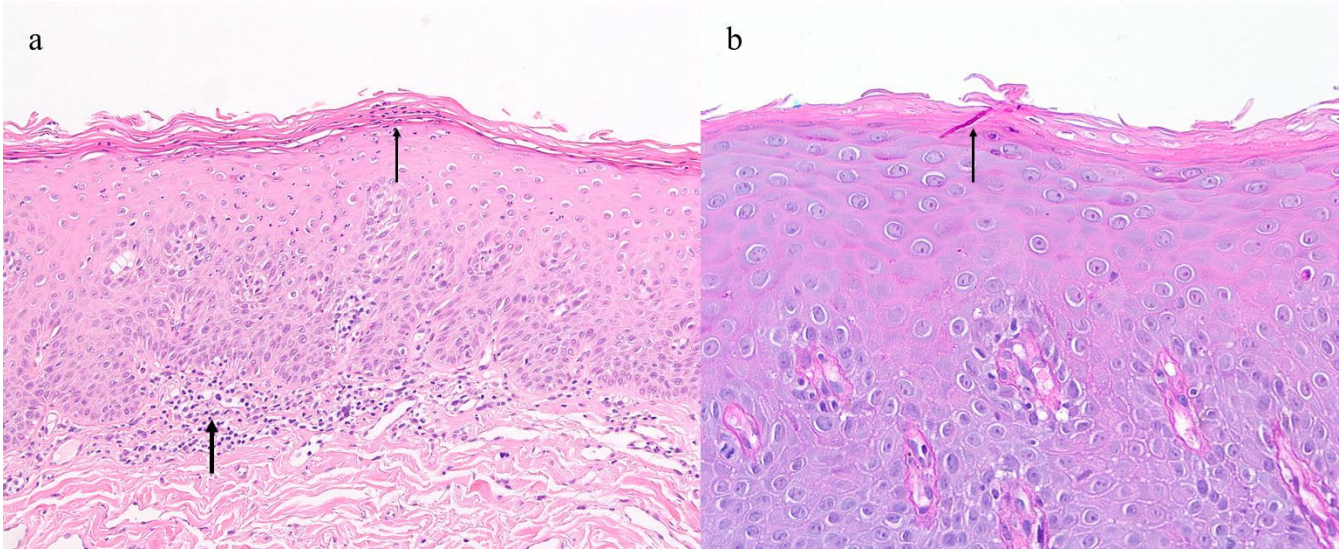

FIG 3 (a) Biopsy of labium majus suggestive of mycosis: hair bearing skin with parakeratosis, a corneal pustule (thin arrow), acanthosis, and moderate perivascular infiltrate (thick arrow); hematoxylin and eosin ×100. (b) Fungal element in the stratum corneum (thin arrow); PAS ×200.

by eosinophils. Drug eruption is a difficult diagnosis to establish, as it often arises from episodic exposure to over-the-counter analgesics, decongestants, or commonly prescribed antimicrobials. It presents with pain and erythema, often symmetric and eroded; histopathology may show a lichenoid, spongiotic, or psoriasiform reaction pattern (74, 75).

Treatment

Treatment approach to vulvar cutaneous candidiasis is guided by the site, severity, comorbid conditions, specialist type, and local protocols. The available clinical guidance recommends against combination products containing topical steroid and antifungal, noting that the steroid component may improve clinical but not mycological cure rates (58, 76). Preventative measures include barrier creams, drying agents, avoidance of allergens and irritants, and minimization of heat, moisture, and friction. Authors of a Dermatology review article advise treatment of mild cases with 2 to 4 weeks of twice daily topicals and recommend 2 to 6 weeks of daily fluconazole 50–100 mg or itraconazole 200 mg for severe disease (43). The approach to RVVC in a cohort that included postmenopausal women was fluconazole 200 mg every third day for three doses, followed by 200 mg twice weekly for at least 6 months (77). Ancillary therapies include weight loss, surgery to reduce skin folds, correction of iron and B12 deficiencies, glycemic optimization, and avoidance of unnecessary antibiotics and exogenous estrogen (43, 57).

Medication-related candidiasis and candidal superinfection

There are two prominent etiologic subcategories of vulvar cutaneous candidiasis—medication-related and superinfection of chronic dermatoses. In this usage, 'superinfection' refers to candidiasis superimposed on an underlying inflammatory skin condition. These are common clinical scenarios in specialized clinics, but scant literature describes the demographics, presentation, management, and outcomes of affected patients. None of the international or national guidelines on VVC address diagnosis and treatment of candidiasis related to SGLT2i, IL17i, or chronic dermatoses (3–10). This lack of published guidance likely contributes to under-recognition, inappropriate or inadequate treatment, and failure to modify provoking medications or conditions.

Prescribed for DM management alone or in combination with metformin or gliptins, SGLT2i share the suffix 'flozin.' These medications prevent glucose reabsorption in the proximal renal tubule, producing glucosuria. The rates of new genital symptoms after SGLT2i initiation are 10–26%, usually occurring within 24 weeks of exposure in patients with positive vulvovaginal culture for *Candida* species (28, 78). Compared to patients with DM not using flozins, this represents a three to fourfold increased risk despite improved glycemic control. Some clinicians prescribing SGLT2i are unaware of this adverse effect or do not inform patients; meanwhile, women may avoid disclosure of vulvovaginal symptoms to their diabetes care provider, and these practitioners may not perform genital skin examination.

The popularity of SGLT2i has revealed a failure to diagnose candidiasis among PCPs and gynecologists (23, 61, 62). Of 24 women seen at a vulvar dermatology clinic for SGLT2i-related vulvar candidiasis, only one patient's referring doctor suspected the diagnosis, and 15 were prescribed topical steroids prior to specialist review (23). The mean age in this cohort was 65 years with a symptom duration of 18 months. Vulvovaginal culture showed *Candida* species in 78%, with five negative results in those recently exposed to antifungals. The authors treated patients with fluconazole 50–100 mg daily until they were asymptomatic and with normalized skin. The average treatment duration was 4 months, and 38% had persistent or relapsing disease until they ceased the SGLT2i. One-fifth of the patients continued the SGLT2i facilitated by an ongoing antifungal maintenance regimen.

Two other dermatology groups published their experience with SGLT2i-related candidiasis. A case series of five patients documented intervals of 1–9 months from

SGLT2i initiation to genital symptoms (61). Delay in diagnosis ranged from 1 month to 6 years, with misattribution of the rash to lichen sclerosus in two patients, vulvovaginal atrophy in two patients, and tinea cruris in one patient. Treatment involved fluconazole 150–200 mg daily to third daily for 5 to 9 days, then weekly for 3 to 4 weeks. All patients elected to cease the SGLT2i to facilitate clinical cure. A British study of 11 women taking SGLT2i who presented with "inflammatory vulvitis with psoriasiform features" documented a mean age of 60 years, symptoms arising 8–24 months after flozin initiation, and positive culture for *Candida* species in 91% (62). Disease improved with single-dose fluconazole and 6 weeks of topical antifungal, but 45% needed to stop the flozin to achieve resolution.

IL17i used for psoriasis treatment increases the risk of candidiasis through diminished host anti-*Candida* defenses (79, 80). Patients with psoriasis often have other predisposing factors like obesity, autoimmune disorders requiring immunomodulatory therapy, and recurrent skin trauma (81, 82). IL17i strongly increases the risk of oropharyngeal, esophageal, and cutaneous candidiasis and moderately raises rates of VVC (79). The rate of any candidiasis on bimekizumab is 6–21% (80). Compared to patients using anti-TNFα therapies, patients on anti-IL17 have a three- to 25-fold higher relative risk of candidiasis (79). The authors of a review article identified an "absence of robust and clear guidelines" on skin manifestations of candidal infection and noted that the IDSA clinical practice guideline for the management of candidiasis does not cover cutaneous disease (4, 80). The result is a range of treatment strategies for severe, recurrent, or non-responsive disease.

Candidal superinfection of chronic dermatoses likely relates to long-term topical steroid use, trauma from rubbing or scratching, and disease-related altered local immunity (56). Among the 201 women of all ages seen at a referral vaginitis center and categorized to have RVVC with at least one positive culture for *C. albicans*, 14.4% had lichen sclerosus or lichen planus (77). Within this cohort, 16% of patients were postmenopausal, of whom 84% used estrogen, and older age was associated with higher relapse rates. The incidence of candidal superinfection is unclear and appears to vary by demographics and underlying skin condition. Among adults with vulvar psoriasis, 54% had a vaginal culture to assess for superinfection, and 36% of these grew *C. albicans* and/or *Staphylococcus aureus* (67). A randomized trial of photodynamic therapy versus topical steroids for genital erosive lichen planus noted candidiasis in 2% (2/40), while a cohort study of long-term vulvar lichen planus management reported superinfection in 4% (5/131) (83, 84). Rates are higher in studies of lichen sclerosus, with 9.5% (4/42) reporting candidiasis in a randomized trial of dermasilk vs. cotton briefs and 6.2% (8/129) in a retrospective study on individualized steroid regimens (85, 86). In studies of biopsy-proven lichen sclerosus and lichen planus with microbiologic testing done at clinician discretion, cultures were obtained in 39 and 56% of cases and positive for *Candida* species in 9.5 and 11.5%, respectively (87, 88). These studies likely underestimate the true rate of superinfection. In a study of 27 biopsy diagnoses of mycosis, clinicians did not suspect fungal infection in 44% and did not obtain a culture in 33% (21). Despite a pathology report indicating mycosis, three treating clinicians did not prescribe antifungal therapy, instead awaiting specialist review.

The clinical context of candidal superinfection is often flare after a period of stable disease, exacerbation in the context of hospitalization or surgery, reported inadequate response to steroids, or dermatologic polypharmacy. Patients may attempt to self-medicate by extending topical steroid use over the labia majora and genitocrural folds, taking single doses of fluconazole 150 mg, intermittently using topical azoles, or applying drying powders. Examination findings vary from subtle pink color change isolated to the area affected by the dermatosis to marked erythema extending over previously normal skin (Fig. 2d). Biopsy of lichen sclerosus with candidal superinfection may show diagnostic features of the dermatosis combined with fungal elements in the stratum corneum (Fig. 4a and b). The lymphocytic infiltrate may be scant despite a large organism

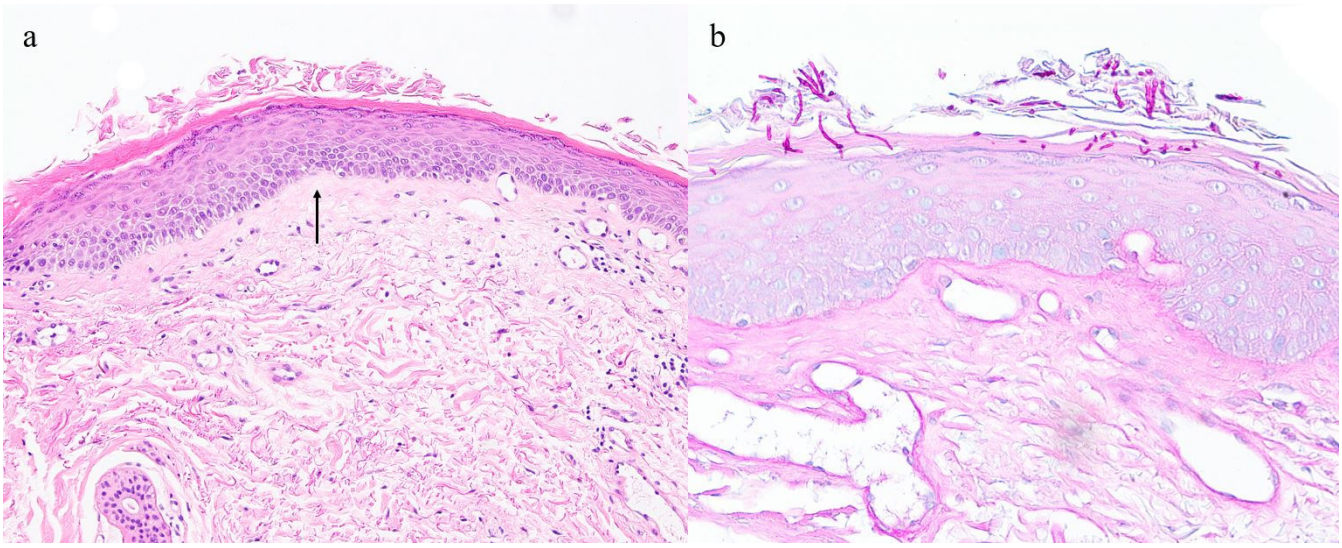

FIG 4 (a) Biopsy of the labium majus diagnostic of lichen sclerosus complicated by mycosis: hair-bearing skin with hyperkeratosis, spongiosis, basal layer vacuolar change, a thin band of hyalinized collagen in the upper dermis (thin arrow), and scant lymphocytic infiltrate; hematoxylin and eosin ×100. (b) Numerous fungal elements in the stratum corneum diagnostic of mycotic superinfection; PAS ×200.

load, likely attributable to use of topical steroids. In some cases, reactive changes arising from the infectious process may obscure histopathologic features of the dermatosis.

Small cohort studies describe the treatment of candidal superinfection with daily oral antifungals for weeks to months, with duration dependent on severity, extent, and comorbidities (21, 22). In patients with recurrent superinfection, adjunctive prophylactic oral antifungal treatment complements topical steroid maintenance (58, 77, 89). Patient and provider preferences and local medication pricing structures also influence the dose and frequency of maintenance regimens. Common regimens are fluconazole 50 mg two to three times a week, 100 mg twice a week, or 150 to 200 mg weekly (22, 77). Vulvar specialists often avoid topical antifungal therapy due to concerns about complicating the clinical picture with contact dermatitis known to occur in 6% of patients receiving aimed patch testing (90).

ESTROGEN-DEPENDENT CHRONIC RECURRENT VULVOVAGINAL CANDIDIASIS

Nomenclature and epidemiology

There are three names applied to relapsing or persistent vulvovaginal symptoms attributable to *Candida* species in estrogenized women: recurrent VVC, chronic VVC, and chronic recurrent VVC (9, 13, 91). They all refer to a long-term autoinflammatory disorder primarily affecting the vagina with varied and often subtle vulvar findings. A systematic review of eight publications estimated the prevalence of RVVC at 7% between 15 and 54 years, with a peak of 9% in the 25–34 age bracket (1). A survey study suggested that 3% of women attending a PCP report VVC episodes once monthly and 3% endorse symptoms "almost all the time" (92). After exclusion of provoking medical conditions and vulvovaginal dermatoses, the demographics of affected patients are consistent, regardless of the label applied. The majority are healthy women under age 40 with a body mass index below 30 kg/m^2 and low rates of intrauterine device (IUD) use (56, 93, 94). The rate of reported atopy ranges from 22 to 66% (93, 95, 96). The age of symptom onset is usually years or decades prior to diagnosis (16, 17, 93, 97). This disorder may arise in or persist during menopause in women on estrogen therapy and remit if exogenous estrogen is ceased (98).

Each of these three terms—RVVC, CVVC, and CRVVC—places a different emphasis on the pattern of symptoms and inalterability of the disease state. The descriptor 'recurrent'

implies a symptom-free interval between VVC events. 'Chronic' describes the situation of near-constant symptoms that may require maintenance antifungals more often than once weekly and represents the severe end of the host-pathogen interaction continuum (1, 91, 93). Combined use of the descriptors 'chronic' and 'recurrent' highlights VVC susceptibility as inherent and non-modifiable—an incurable condition that requires ongoing antifungal suppression (9). The remainder of this document will use CRVVC to encompass the cohort of otherwise healthy estrogenized women with long-term symptoms arising from a disordered immune response to yeast.

Symptoms, impacts, signs, and diagnostic tests in CRVVC

Patients report frequent or persistent vulvovaginal pain or burning, redness, swelling, and dyspareunia (97). Flare is common before menses or during and after intercourse. Rather than increased discharge, some women report a sense of dryness (99). Multiple authors in varied care settings document major quality-of-life (QoL) impacts associated with CRVVC, with comparable or worse scores than patients with migraine, asthma, and chronic obstructive pulmonary disease (38, 100, 101). A study using a vulva-specific validated 45-point instrument found poorer QoL in patients with CRVVC than those with lichen sclerosus and lichen planus, with the sexual function domain as the most affected (38). Post-treatment assessment demonstrated a reduction in the median score from 24 to 9 and a faster rate of improvement in patients with CRVVC than those with lichen sclerosus or lichen planus. Health status impacts persisted despite antifungal maintenance therapy, in part due to anxiety and depression (101).

Examination is often unrevealing but may show subtle erythema of the vestibule, periclitoral structures, and interlabial sulci (97). There may be mild labial and periclitoral edema and fissures over hairless skin (52). There is no vulvar architectural change, vaginal erosion, or agglutination. Any positive culture for *C. albicans* supports the diagnosis, but 15–30% of women with characteristic symptoms and rapid response to antifungals have negative cultures (52, 56, 93, 94). The lack of specific clinical and laboratory findings in these patients means they are excluded from most clinical studies, making publication results less generalizable. However, multiple consecutive negative cultures or molecular tests while off antifungal therapy cast doubt on the diagnosis of CRVVC. The histopathologic appearance of CRVVC is unknown. If the vulvar skin and vaginal discharge appear normal, and the culture is negative for *C. albicans*, the clinical differential diagnosis is vulvodynia, but the two may also be concurrent (9, 102). An examination for pain at the base of the hymen and pelvic musculoskeletal structures permits the identification of a pain syndrome. If there is subtle erythema at interlabial folds, competing or supplemental diagnoses include inverse psoriasis or dermatitis.

Comorbidity with bacterial vaginosis

A subset of women with recurrent bacterial vaginosis (BV) also experience CRVVC often in the days after antibiotic treatment with metronidazole or clindamycin (103). At a referral vaginitis clinic in Detroit, Michigan, 80% of patients with recurrent BV reported previous VVC (103). Women characterized candidal vaginitis as an inevitable consequence of BV therapy rather than the dominant affliction. At the same clinic, 26% of women with a primary problem of RVVC had at least one episode of BV (56). Affected patients have a mean age of 32 years, and most are otherwise healthy Black women (104). The link between BV and VVC may be related to increased candidal colonization rates in the higher pH environment, antibiotic-induced changes in the microbiome or local immune environment, proinflammatory nature of vaginal dysbiosis, and synergism in the establishment of a biofilm (103). Treatment options for combined or sequential BV and VVC include simultaneous administration of fluconazole and metronidazole tablets or vaginal gel or vaginal boric acid alone or as an adjunctive measure (104).

Treatment

International consensus on the management of CRVVC is treatment with antifungals, followed by long-term maintenance therapy. When the known or suspected pathogen is *C. albicans*, the agent of choice is fluconazole due to accessibility, tolerability, and cost. Published protocols differ in stated treatment goals and dosing protocols. One approach advocates for the eradication of symptoms achieved through individualized drug doses and regimens often via treatment with daily fluconazole 50 to 100 mg for 3 months, followed by indefinite suppression with 50 mg twice a week to daily (52, 93). Criticism of this strategy arises from the lack of controlled studies and a hypothetical concern that protracted daily regimens contribute to antifungal resistance (7, 105). The European ReCeDif program involves fluconazole 200 mg every third day for three doses, then 200 mg weekly for 2 months, then fortnightly for 4 months, and monthly for 6 months. In a prospective study of this intervention, 33% of participants continued the reducing regimen without symptom relapse or colonization; 39% repeated the treatment course or stayed at a higher maintenance dose; and 28% stopped the protocol due to multiple relapses or persistent positive cultures (94). The CDC and WHO/IUSTI protocols involve induction with 100–200 mg third daily for three doses, and then 100–200 mg weekly for 6 months (3, 10). The Canadian, British, Australian, and ISSVD regimens use the same schedule but specify 150 mg dosing during treatment and maintenance (5–8).

In a real-world setting, 73% of women who completed 6 months of weekly fluconazole continued maintenance therapy beyond that timeframe (56). Weekly regimens produce symptom resolution in approximately 80% of women, while 20% report relapses or partial improvement (56, 99). The rate of emerging fluconazole resistance among long-term users of weekly fluconazole is uncertain but may be up to 7% (56, 77). None of the international or national guidelines on VVC describe potential indications for treatment courses over a 2-week duration, maintenance dose frequency greater than twice weekly, or duration longer than 12 months (3–10). Guideline authors advocating for fixed-duration antifungal regimens should provide advice about managing post-protocol recurrence in recognition that it is clinically unacceptable to deny effective treatment to patients.

Short-term antifungal prophylaxis in women taking antibiotics provides an additional mechanism to prevent relapse. This involves increasing the treatment dosing to 50 mg daily or 100–200 mg twice weekly during the antibiotic course (89). The impact of other ancillary measures on reducing CRVVC severity appears limited, and provision of a long list of banned behaviors may exacerbate patient misery and damage the therapeutic alliance (106). Vulvar skin care advice with reinforcement at subsequent visits likely reduces the potential for concurrent dermatitis and empowers patients in self-management (7, 102). Reduction in endogenous estrogen through the use of higher-dose progestogens is useful in some women; a subset of patients reported improvement after cessation of estrogen-containing contraceptives or the IUD (9, 107, 108). There is no evidence to support adopting a particular diet or treatment of asymptomatic partners. Despite academic and community interests in probiotics, prebiotics, and synbiotics, the methodologic quality and results of studies are mixed, and most products available for purchase are expensive, have low quality, and are poorly standardized (13, 109).

RECENT DEVELOPMENTS

The limitations of current diagnostic strategies underlie continuing research into tests that might provide rapid, reliable, and species-specific identification, even when organism numbers are low. Yeasts have distinct signatures on mass spectrometry performed via matrix-assisted laser desorption ionization and detection in a time-of-flight (MALDI-TOF) analyzer (110). This technique has high agreement with culture for *C. albicans*, *Candida glabrata*, *Candida tropicalis*, and *Pichia kudriavzevii* (41, 110). The process involves a small microbial colony grown in culture, subsequent biomolecular ionization, and an expensive machine (111). In laboratory settings already using

MALDI-TOF, results may be available within 48 h. Artificial intelligence for visual diagnosis integrated with single-swab automated pH, microscopy, and/or molecular tests may eventually overcome traditional barriers to vulvovaginal disease diagnosis (112–115).

Two new antifungal agents—oteseconazole and ibrexafungerp—are now available in the US and Canada for treatment of VVC. The European Medicines Agency application for oteseconazole was withdrawn in August 2024, but it is available for research use in the United Kingdom (UK). Access to ibrexafungerp in the UK and Europe is via clinical trials. Neither medication is available in Australia or New Zealand. Oteseconazole is an oral tetrazole that inhibits ergosterol biosynthesis, the same mechanism as triazoles but with enhanced selectivity for fungal rather than human cytochrome P450 enzymes (116). Marketed for CRVVC, the dose structure is 600 mg on day 1, 450 mg on day 2, and 150 mg weekly. The half-life is 138 days, and it is contraindicated in pregnancy, so the current approval is restricted to women without reproductive potential (116). Ibrexafungerp inhibits glucan synthase, interfering with fungal cell wall formation. For treatment of acute VVC, it is dispensed as four 150 mg tablets, with two taken 12 h apart for a 600 mg course. Due to a half-life of 20 to 30 h and extensive tissue distribution, it may be used once monthly for CRVVC as maintenance therapy (116, 117). It is also contraindicated in pregnancy (118). Given their expense and potential teratogenicity, the primary impact of these antifungals is management of fluconazole resistance or intolerance in selected patients. Oteseconazole and ibrexafungerp have clinical cure rates of ≥70% for fluconazole-resistant *Candida* infections, comparable to boric acid and voriconazole (119). Rates of eligibility for use in the cutaneous candidiasis population would be higher than for CRVVC, but there are no studies yet to confirm that dosing and efficacy of ibrexafungerp and oteseconazole may be extrapolated from the VVC evidence.

Investigation into VVC immunotherapies includes vaccine development and neutralizing antibodies against targets like IL-9 and IL-1Ra (44). Challenges to the elaboration of an anti-*Candida* vaccine include its role as a commensal, antigenic variation within and across species, an array of disease sites, and the diversity of host immunological statuses. Trials of two recombinant vaccines suggested safety and immunogenicity, but a placebo-controlled trial showed minimal difference between groups (120). The emerging field of nanozymes may provide a mechanism for targeted fungal cell death with reduced potential for resistance (121). Accumulation of knowledge on the interaction between immunologic dysfunction and the microbiome may inform mechanisms for therapeutic modifications that move beyond concepts of probiotics and vaginal fluid transplantation (44, 122, 123). Research into novel therapeutic targets and systems should include cutaneous candidiasis as a population of interest distinct from VVC when evaluating efficacy and acceptability.

CONCLUSIONS

Clinicians and patients would benefit from the promulgation of an expanded, nuanced classification of genital candidiasis based on pathogenesis that recognizes two distinct clinical disease categories—estrogen-associated VVC and estrogen-independent vulvar cutaneous candidiasis. Explicit description of the clinical presentation, role and limitations of culture, biopsy findings, and management of cutaneous candidiasis would bring visibility to this overlooked entity. An improved evidence base will require researchers to separate the two disease states, document comorbid dermatologic conditions, report pertinent negative investigations, define treatment goals, describe long-term outcomes, and interrogate the external validity of their conclusions. Ideally, future work on candidiasis should pursue interdisciplinary collaboration and a patient-centric approach to enhance diagnosis and management across all affected populations and disease manifestations.

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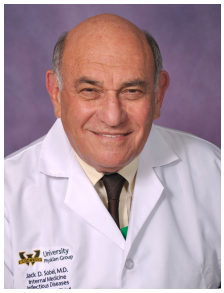

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